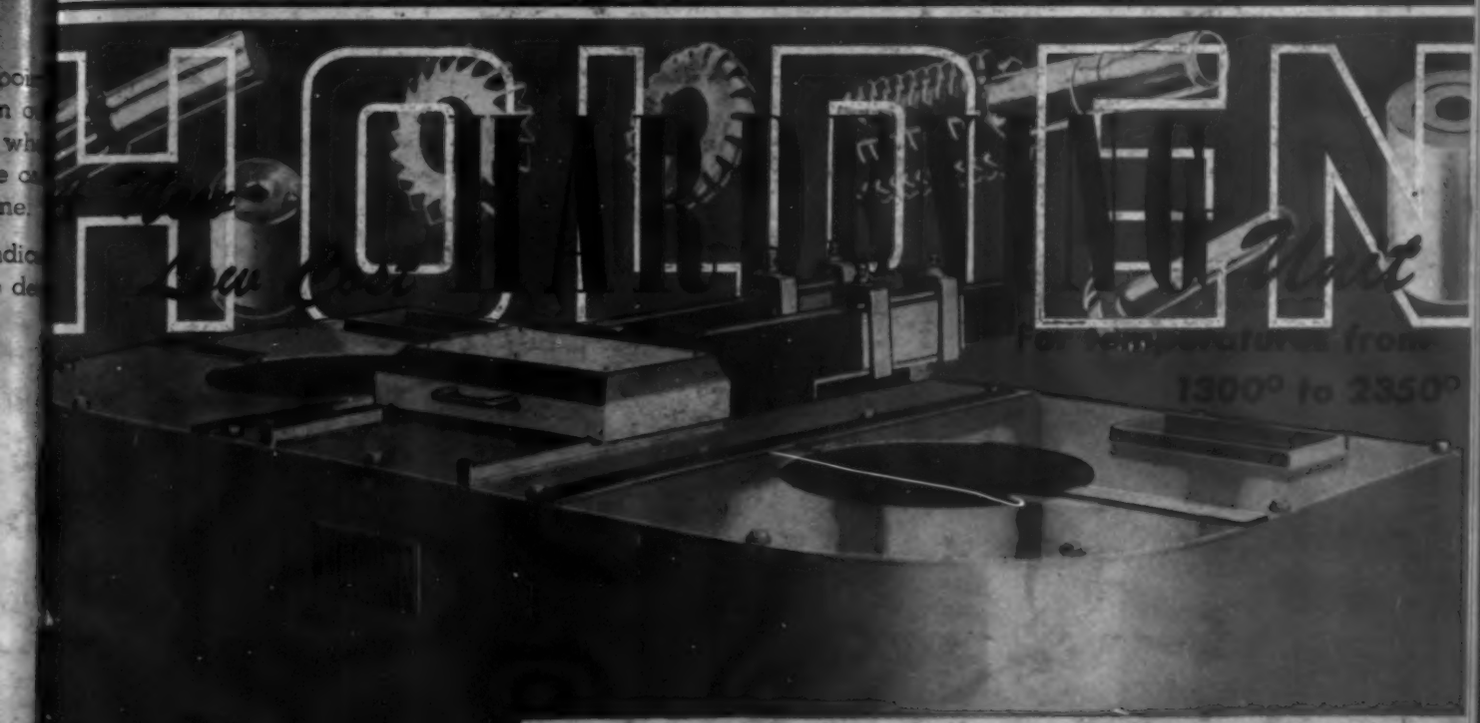
July 19, 1943

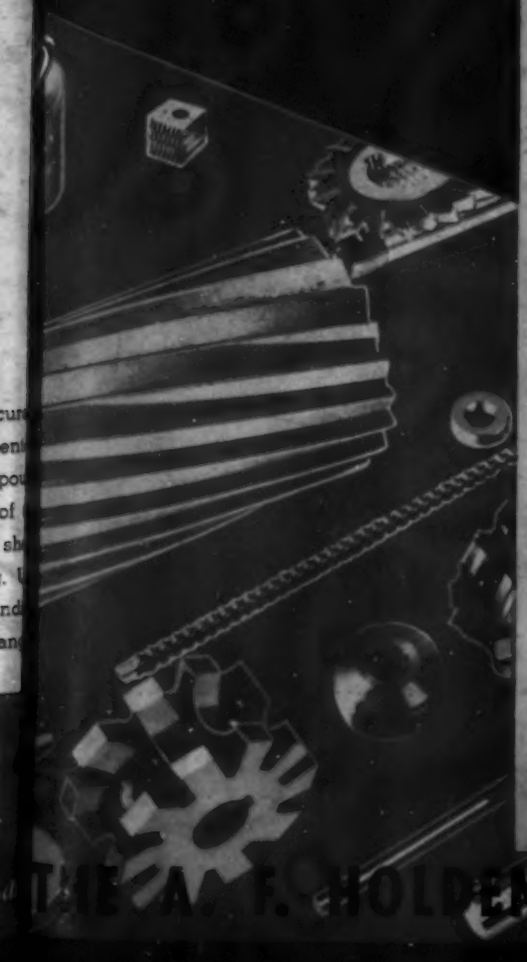
STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

DETROIT
TECHNOLOGY DEPT.





For All Types of TOOLS

1 For PREHEATING High Speed Steels or for heat treating water or oil hardening steels—1300° to 1750° F.

2 For HARDENING High Speed Steels any type or any alloy steel from 1750° to 2350° F.

3 QUENCHING unit for High Speed Steels or Alloy Steels.

SCALE-FREE HARDENING

NO DECARBURIZATION

75% Less Floor Space for Same Production

WRITE FOR BULLETINS

S100 POT FURNACES S101 HY-SPEED CASE S102 DEFENSE TOOLS
S103 BRIGHT TEMPER S104 LIQUID CARBURIZING

MANUFACTURERS OF HOLDEN PRODUCTS IN CANADA
PEACOCK BROTHERS LTD., P. O. Box 6070, Montreal, Canada

THE A. F. HOLDEN COMPANY, New Haven, Conn.

Take a Lesson from a Tin Fish

"Enemy destroyer dead ahead" . . . a torpedo plane swoops down level and low . . . a tin fish drops to the sea and streaks straight and true to blast another ship to destruction.

It takes over 5000 parts and 1200 different assemblies to make one of these complicated weapons and every one must be accurate to the closest tolerances, because the slightest error would mean no hit. Heald Bore-Matics have been chosen in many plants to help put much of this deadly precision into many torpedo parts.

If you have a boring or grinding problem that requires precision and fast production, take a lesson from the tin fish . . . by bringing your problem to Heald. Our engineers will gladly help you solve your problems of precision boring and grinding.

Precision boring, facing and chamfering operations are performed in each of the four hubs on Torpedo Bodies on the Heald No. 46B Bore-Matics shown above. The Bore-Matic is arranged with a single boring head carrying four tools and a horizontal rotary indexing fixture for indexing between operations in each hub. The part is located in the fixture on a vertical stake and from one dowel hole, and is clamped against the bottom face by a "C" washer and nut on top.

The Heald Machine Co., Worcester, Mass., U. S. A.

For More Precision Faster, bring your problems to Heald

One place we like to see Jap flags

Neatly painted on the dirty-gray shoulder of a fighter plane . . . one for each Jap plane destroyed . . . these little Jap flags are the favorite decoration of our fighting pilots. And they are appearing regularly. Four of them for every plane of ours that is lost, according to statistics.

U. S. pilots are consistently out-thinking, out-flying, out-gunning the little yellow men. And our planes—the Grummans, the Corsairs, the Cobras, the Lightnings, and the Warhawks—every one of them seems to have proved itself a better all-round fighting plane than the Zero.

We of Bethlehem are proud to say that we've been helping, from the first, in the production of power-plants for these aircraft. Cylinder sleeves, thrust-bearing liners, cams, gears, connecting rods, shafts, counter-weights, spacers, housings, brackets, and dozens of other forgings for fighter-plane and bomber-plane engines.

Bethlehem is also making steel for the ammunition used by our aerial fighters. Special steel of "music-wire quality" for machine-gun recoil mechanisms, bullet-core wire for millions of rounds of machine-gun ammunition, and shell-case steel for 20 mm. and 37 mm. aerial cannon. In addition, this company fabricated and erected the steel for many of the factories that now are turning out swarms of fighter planes.

In the air, on the ground, and on the sea, Bethlehem steel is in the fight. Bethlehem facilities are completely, continuously engaged in producing weapons and materials for the world-wide fighting fronts—and in meeting essential needs of the war-production front at home.

★ ★ ★ BETHLEHEM STEEL ★ ★ ★

UNITED
BLOOMING AND
SLABBING MILLS
ALL TYPES, ALL SIZES
INCLUDING
THE WORLD'S LARGEST

UNITED ENGINEERING *and* FOUNDRY COMPANY

Pittsburgh, Pennsylvania, U S A

BEHIND THE SCENES

More On the Tardy Private

■ NE Steel Selectors and NE Steel Handbooks are in the mail and headed toward four "winners" of the tardy soldier problem. We have to put winners in quotes because actually no one sent in the correct answer. D. R. Lopri, Carnegie Illinois sales engineer, came edging right up close with an answer of 46¾ minutes; D. A. Webster of Ft. Wayne overshot it with 47 minutes; Mrs. E. M. Whelchel, Pittsburgh Testing Laboratory at Birmingham was shy at 46 (and there is no pun intended because unfortunately we don't even know Mrs. Whelchel); and Capt. C. W. Lake Jr., Watervliet Arsenal, went all out with some very excellent algebra and ended up with 46 minutes 9.24 seconds.

We'll still continue to pay off on anything between 46 and 47 up until this issue is published but the correct answer (so we still believe) is 46 2/3 on the nose.*

Subscription Cancellation

■ Major Alan M. Watson is now somewhere out where things are popping and we believe you will be interested as we were in this V-mail letter from him asking us to cancel his subscription to STEEL:

Much as I would like to continue my subscription I regret that circumstances compel me to ask that it be cancelled.

I have received a great deal of information from your very well written publication and when I was following my chosen vocation found it helpful in many ways. But my present job gives me little time to spend in reading. There are many other things to be done over here.

In regard to scrap you should see what the Germans left behind. It would make a mill operator back in the states very happy if he had it. Some means should be promoted to ship this stuff back home.

Thanks for your past services, and trust we can renew them in the near future.

In There Pitching

■ The S. S. WILLIAM MOULTRIE was built in 1942 by the North Carolina Shipbuilding Co. The following as told by one of the crew will give you some idea of what a merchant ship does with itself these days.

"On the way to Russia, we were bombed on ten different occasions. A ship carrying explosives was blown up right in our face. The concussion was so great it knocked everybody flat on their backs. The MOULTRIE was literally blown clear out of the water. It hit so hard coming down that it bounced back again. After the second bounce, the bow took a deep dive, leaving the stern high in the air, but she settled and righted herself and never took on a quart of water. We were attacked ten days in succession by hundreds of torpedo planes and when we finally got into Russia we got the biggest attack of all, while in the harbor."

Recently more was added to the story of the MOULTRIE in another production communique to the shipyard:

"The MOULTRIE has distinguished itself again. In a running fight that lasted a week, its crew downed eight Nazi planes, damaged twelve, chased off a submarine and exploded a torpedo with direct hit as the torpedo came toward their ship."

Bad Influence

■ This is from "Valdura Views" and you're probably going to find yourself in at least one classification, but don't blame us:

. . . *An Engineer* is said to be a man who knows a great deal about very little and who goes along knowing more and more about less and less until finally he knows practically everything about nothing; whereas,

. . . *A Salesman*, on the other hand, is a man who knows a very little about a great deal and keeps knowing less and less about more and more until he knows practically nothing about everything.

. . . *A Purchasing Agent* starts out knowing practically everything about everything, but ends up knowing nothing about anything, due to his association with engineers and salesmen.

United Nations' Flag

■ The United Nations' flag, as you may have heard, is four vertical red bands separated by three vertical white bands, the red ones symbolizing the Four Freedoms.

That is, the flag is like that every place except in India and Honduras. In these two countries the color of the four red bands had to be changed to blue. It seems that in India red is the color of bloodshed and suffering and in Honduras red and white just happen to be the colors of the political party not now in power.

Food News

■ "A goofy lunch pulls your punch!"

That's the slogan on one of Walt Disney's new posters for war plants. That tired feeling you get in hot weather may be due to the fact that your lunch doesn't contain something "you should have et". A snack with a lack, the nutrition experts say.

**Why, oh why, do we ever get involved in these mathematical problems clear over our simple little 2 x 2 ability. The morning's mail brought in a whole stack of very expert solutions from E. M. (National Rubber Machinery) McCurry's three-pager to V. Williams' (RCA Victor) depressing comment of "why not make 'em tough" and his answer of 2 10/13 hours. We'll pay off but maybe the best bet now is to change the subject with something like—"How's your garden doing these days?"*

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Editorial Contents—Page 67

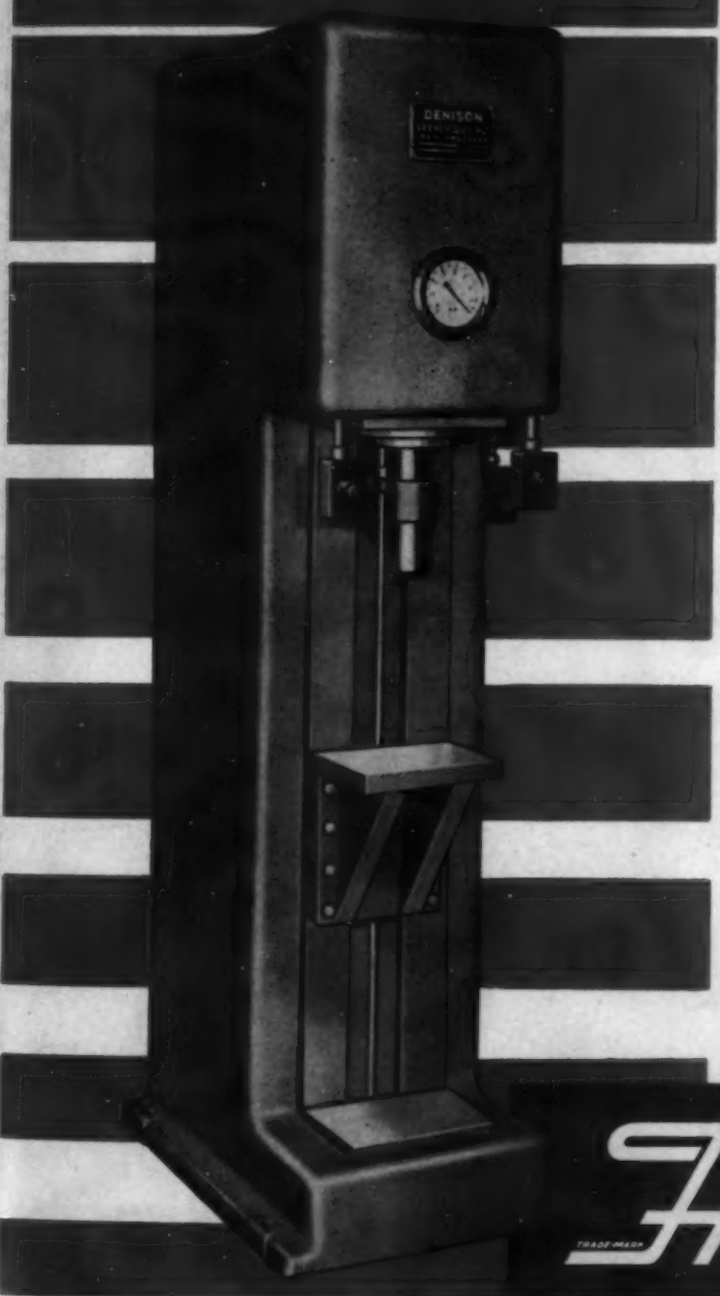
THE JEEP of the PRESS FIELD

Quickly Adaptable to 101 Needs

Here's a rugged knee-type press that's as versatile on the production front as the jeep is at the battlefront!

Specially designed for quick, easy changes and adjustments of tools, fixtures, bolsters and supports, it gets into action in a hurry on any number of different requirements — one right after another — with little or no time out between jobs. Yet it also delivers top efficiency under hard, continuous service on routine production-line operations.

This DLKC2 HydrOILic Press is available in 5, 15, and 25-ton capacities, with an eight-inch throat opening and a maximum stroke of 30 inches. Stroke and pressure may be pre-set by means of simple controls; or the operator, guided by the accurate pressure gage, can "inch" the tonnage upward at will, to meet special or exacting requirements. A highly compact, streamlined, fully self-contained press. Hand or foot control — or both — can be supplied. Electric control also available. Write today for full details!



The DENISON ENGINEERING COMPANY
1163 DUBLIN RD., COLUMBUS, OHIO

DENISON EQUIPMENT in APPLIED Hydr OIL ics

WHEN *the* 33*rd* STAR *was* ADDED!

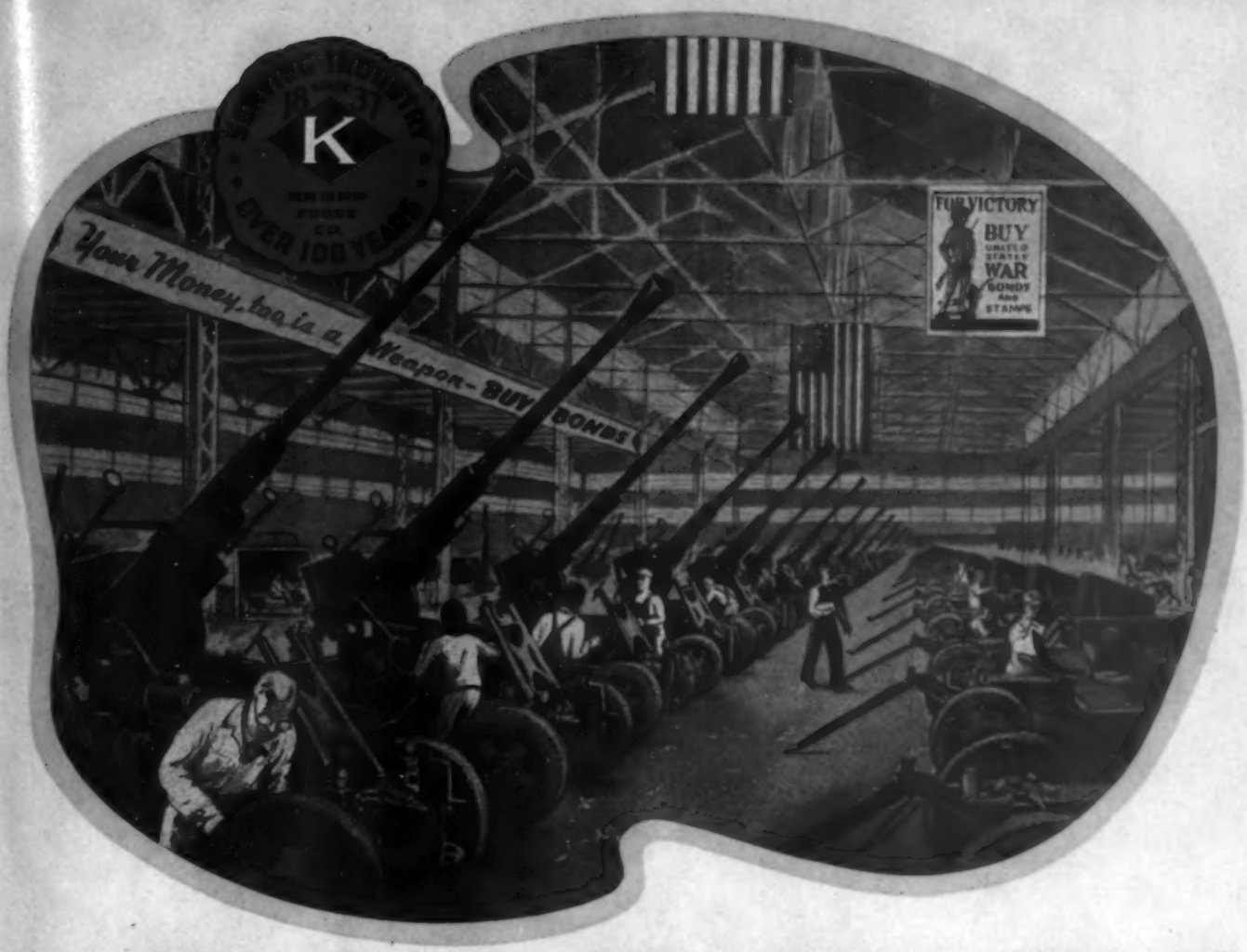
THE
CLEVELAND-CLIFFS IRON
COMPANY
was founded

1850 California was admitted to statehood and development of the Lake Superior Iron Ore region began. Now, as in all the years since that date, the resources of The Cleveland-Cliffs Iron Company are at the command of American industry.

LAKE SUPERIOR IRON ORES
VESSEL TRANSPORTATION
• • • COAL

CCC

THE CLEVELAND-CLIFFS IRON CO.
CLEVELAND • • OHIO



Let The Enemy War Birds Come!

America's anti-aircraft guns are giving our planes real competition in the grim job of depleting enemy air power. Their range and accuracy mows down enemy aircraft, or keeps them at such altitudes that their bombs fall wide. Their flexibility and rapidity in action has proved disastrous for dive and torpedo bombers, and mounted for rapid mobility, they won their spurs in Tunisia and the South Pacific, where they proved devastating against ground as well as air forces.

Back of the deadly work of these modern-day guns is not only advanced design but staunch construction. The impacts and stresses of rapid fire are taken in stride by the toughest of forged parts. At Kropp Forge, we take pride in the vast quantities of rugged forgings we are turning out for anti-aircraft guns, planes, ships, tanks, military vehicles and essential war machinery.

The inquiries of armament builders for forgings of all types are solicited.

Kropp Forge Company

Makers of Drop, Upset and Hammer Forgings for Ships, Guns, Planes, Tanks, Ordnance and Machine Tools

"World's Largest Job Forging Shop"

5301 W. Roosevelt Road, Chicago, Ill.

Engineering Representatives in Principal Cities

Proudly we fly the Army and Navy "E" flag and stars, awarded and re-awarded for excellence and proficiency in the production of war materiel.

KROPP

TOMORROW is cast in the furnace of today—and not all the wisdom of the sages can make a good product from a poor pattern, nor sound material from an unsound melt.

★ ★ ★

In all its years, Union has projected into its castings the soundness of its metallurgical knowledge, the "know-how" of its pattern-making, understanding of the stresses of use. Union's men of science have always had Tomorrow in mind.

★ ★ ★

The men of Union had Tomorrow in mind when they pioneered that new, tough steel called "Univan" . . . the Web-Spoke driving wheel center for locomotives . . . the amazing new-day method of combining cast and fabricated parts known as "Fabricasting."

★ ★ ★

Even today, all-out for Victory, these men have the pattern of Tomorrow very much in mind. Though they may not be able to supply you promptly with goods until "unconditional surrender," they can and will think and plan with you—for your *better* products and *greater* profits.

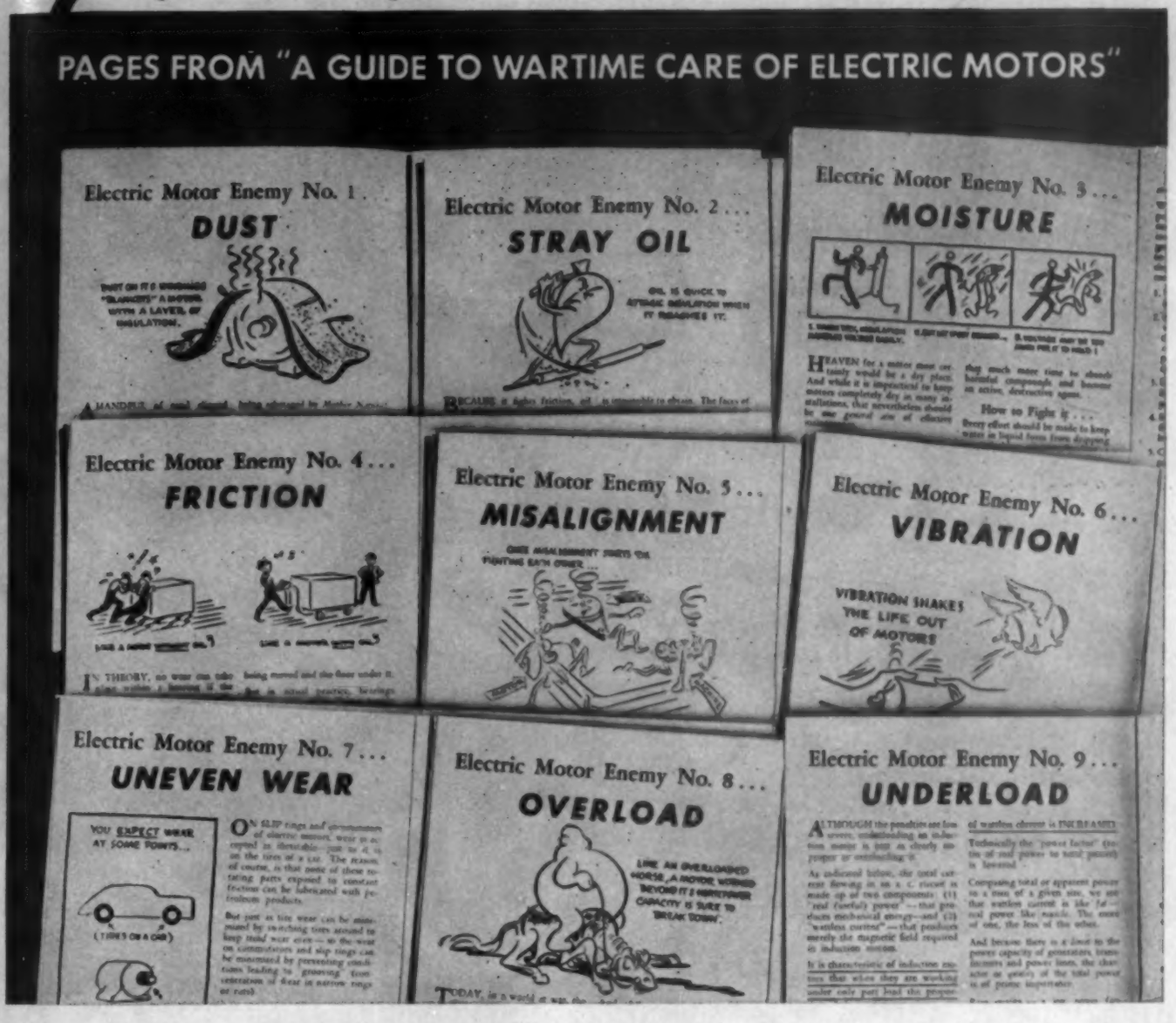
UNION STEEL CASTINGS DIVISION OF BLAW-KNOX COMPANY • PITTSBURGH, PENNSYLVANIA

MAKERS OF:

Driving wheel centers, locomotive frames, pump casings, vault doors and frames, annealing boxes, spindles, coupling boxes, open hearth charging boxes, gear blanks—and other steel and alloy castings for steel mills and general industry.

1 Pill for 9 Headaches!

PAGES FROM "A GUIDE TO WARTIME CARE OF ELECTRIC MOTORS"



ALL NINE electric motor enemies are present and accounted for in Allis-Chalmers' new "Guide to Wartime Care of Electric Motors." Streamlined instructions and story-telling pictures describe what they are, where they're found, how to fight them.

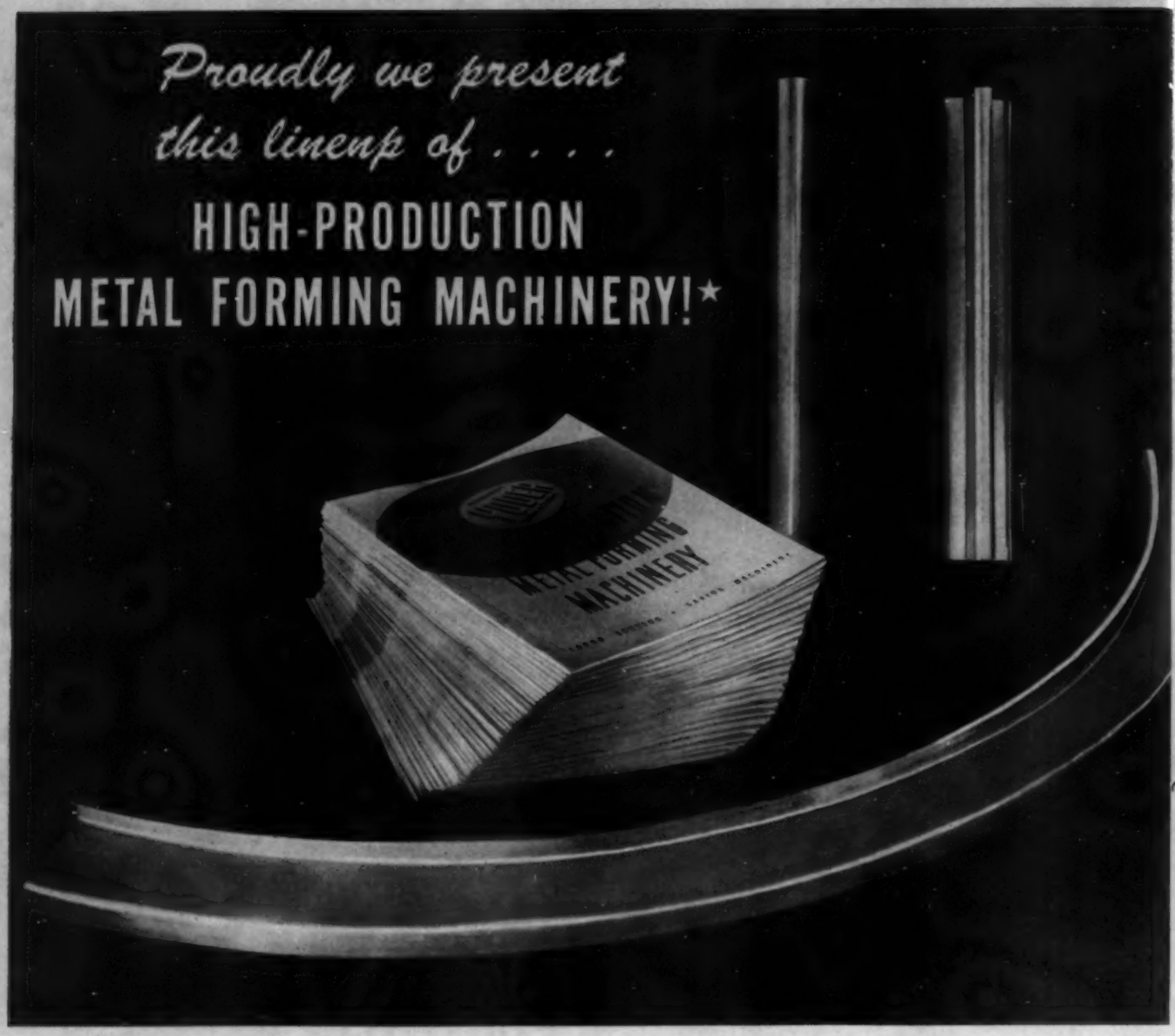
Designed for wartime U. S. industry, "Guide to Wartime Care of Electric Motors" has aroused such world-wide demand that Spanish and Portuguese editions are now printing!

You'll find this valuable new handbook ideal both for training new men and "brushing up" old hands. It contains no advertising. Write today for *your* free copy of this tremendously successful handbook to ALLIS-CHALMERS MFG. CO., MILWAUKEE, WISCONSIN. A 1625

ALLIS-CHALMERS MOTORS
When you do need new motors, look into the strength, solidity and all-around protection of the new "Safety Circle"—protected top, sides, ends and bottom.
A-C
WE WORK FOR VICTORY
WE PLAN FOR PEACE

Proudly we present this lineup of . . . .

HIGH-PRODUCTION METAL FORMING MACHINERY!★



★ To the fabricator wanting the machines that embody the largest number of the latest in improvements in this type of equipment, we say, "You will do well to choose a 'Yoder'."

When we tell you that, "You get the improvements first from Yoder," we point with pride to our record of thirty years and more of pioneering effort.

The war emergency has placed tremendous emphasis upon high-production machinery. Yoder Equipment gives you an "up-to-dateness" that helps you to face today's and tomorrow's problems with complete confidence.

This "Yoder High-Production Metal Forming Machinery" BULLETIN is not meant to answer all of your questions—just to give to you a general idea of the things we have been designing and manufacturing. When it is roll-forming, cutting-off, edge conditioning, uncoiling, slitting, coiling, bending, leveling, and tube making, send us your sketches and a few details. We'll respond with a "proposal" including prices and recommendations. However, if your interest has not progressed to that stage, just send for the BULLETIN and we'll be glad to mail it to you immediately.

METAL • FORMING • PRODUCTION • MACHINERY

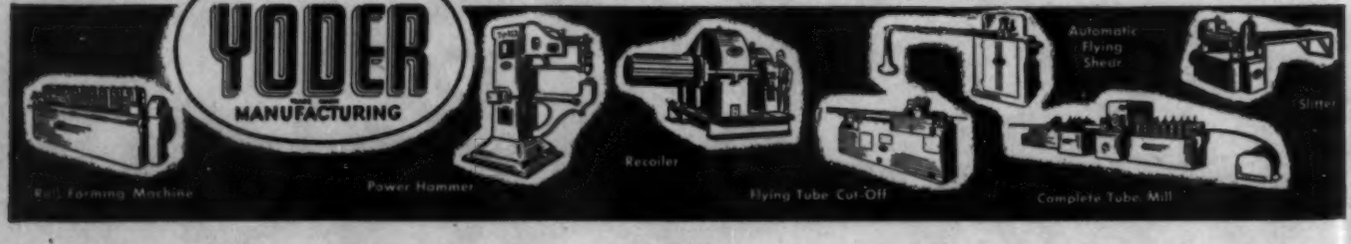
ENGINEERING

YODER

MANUFACTURING

THE YODER COMPANY

CLEVELAND, OHIO • U.S.A.



The sun never sets on the fighting jeep . . .

COURTESY WILLYS-OVERLAND MOTORS INC.

nor on **N-A-X** high tensile steel

DUCTILITY STRENGTH

Battle-proved on a score of fighting fronts, the Willys-built Jeep has earned a world-wide reputation for ruggedness, for built-in stamina, and for ability to take punishment under all sorts of conditions as to both temperature and terrain.

N-A-X HIGH TENSILE Steel is used in the construction of the Willys-built Jeep, and the unusual qualities of this steel find expression in the field performance of this most versatile of all combat vehicles.

N-A-X HIGH TENSILE is used in countless other types of fighting equipment, too, wherever strength, ruggedness, and high resistance to impact and fatigue are required. And on every battle front, in every theater of war, N-A-X HIGH TENSILE is daily demonstrating its excellent qualities.

Write today for your copy of a new booklet describing fully the properties and characteristics of N-A-X HIGH TENSILE and the N-A-X 9100 Series Alloy Steel.

GREAT LAKES STEEL CORPORATION
Detroit, Michigan
Sales Offices in Principal Cities

NATIONAL STEEL

Division of
NATIONAL STEEL CORPORATION
Executive Offices · Pittsburgh, Pa.

Hauser-Stander "know-how" plus Monel BUILDS PICKLING TANKS THAT HELP WIN

Less time spent in repair or replacement of pickling equipment means *more* time spent working for victory.

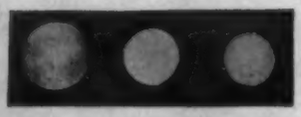
That's why pickling tanks which give long, trouble-free service . . . like the one above built by Hauser-Stander Co. of Cincinnati, Ohio . . . are so important today.

Hauser-Stander builds first-class equipment because this well-known firm has the proper "know-how"... the combination of skill and experience that gets the *right* answer for tough problems. And part of that "know-how" includes *selecting the right materials.*

For example, Hauser-Stander tanks are equipped with tie-rods, washers and nuts of Monel.

Uniquely fitted for use in pickling equipment, Monel is tough, strong, and highly resistant to corrosion. In addition to fittings for tanks, Monel is also ideally suited for crates, baskets and other pickling equipment.

When pickling tanks have given their full years of service, the Monel tie-rods usually may be put to further use as separator pins and other handling equipment, thus keeping every ounce of this vital metal at work. The International Nickel Company, Inc., 67 Wall Street, New York 5, N. Y.



THESE THREE TIE-RODS were used for a full year in a large steel sheet mill. The two on the right, shown in cross-section above, are not Monel; though unchanged in diameter, their metal structure has been changed and weakened by corrosion. The Monel rod at the left is uniform and unchanged.

★ ★ **INCO NICKEL ALLOYS** ★ ★

MONEL • "K" MONEL • "S" MONEL • "R" MONEL • "KR" MONEL • INCONEL • NICKEL • "Z" NICKEL

Sheet... Strip... Rod... Tubing... Wire... Castings

How many machine tool operations help to arm the

gods of the upper air . . .

Into a single engine of the planes they fly, go thousands of individual manufacturing operations . . . to accuracies measured in thousandths, ten thousandths or even millionths of an inch.

The power of a single turret gun is the sum of a dozen engineering sciences and a hundred skills.

Even the breath of life itself, to these gods of the upper air, is the product of many machines.

And of all the complex, intricate and wonderful tools in use by the aviation industry, none is more basic or more vital to production than the precision internal grinding machine.

BRYANT

BRYANT CHUCKING GRINDER COMPANY

SPRINGFIELD, VERMONT, U. S. A.

Nine hundred of these 43-pound aluminum housings were salvaged in a year's time by building up their worn, iron inserts by metallizing. The large amount of precision machining that would be required for finishing new castings was avoided. The old bearings were re-used, and the reworked assemblies gave more service than originally.

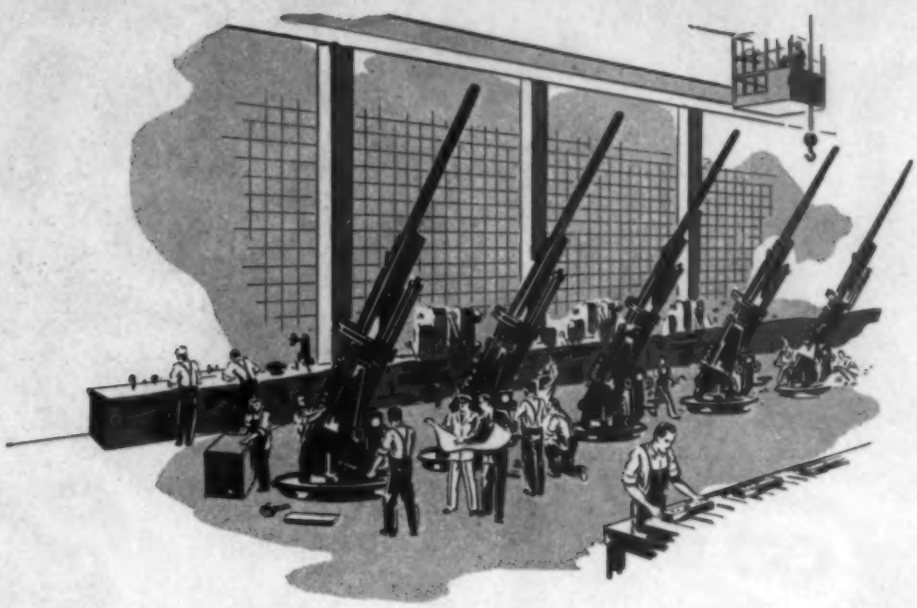
Thus the war effort is being aided by conservation of materials and labor, and the continuation in service of hard-to-get equipment.

The iron insert in this housing is subjected to severe thrust from the gears, so it must be anchored solidly. This is taken care of by casting it integrally with the aluminum housing. Building up a worn insert by metallizing does not disturb this security, nor does the work reduce the high strength of the aluminum. The added metal is bored out and the original bearing put back in place, ready for additional months of service.

Perhaps there's a cue here on means of maintaining *your* hard-working aluminum alloy equipment. Had the aluminum part of this assembly been worn, it, too, could have been salvaged by metallizing with aluminum. Alcoa engineers will gladly advise you on methods of doing this. ALUMINUM COMPANY OF AMERICA, 2112 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA ALUMINUM

ALL OUT OF *One Part* STOPS "ALL-OUT" PRODUCTION



YOU can't maintain all-out production when you are all out of even *one* part! Quantities "too little or too late" . . . or off standard quality that forces rejections of parts . . . can seriously penalize the war effort! . . . If one or more difficult parts are hazards to peak production in your plant now, or are "headaches" in your plans for future post-war products . . .

Contact KAYDON

Here is an organization with a staff of engineers who have had decades of experience in metallurgy, precision metal-working methods, and plastics. Their experience is fortified by progressive research, modern laboratory, tool room and quantity production facilities — all of which permit Kaydon to tool up for mass production of difficult high-precision parts, on a speed schedule considered unnecessary before global war problems confronted industry. . . . Kaydon has facilities available now for some additional war production and post-war product development.

CAPACITY Immediately AVAILABLE for ball and roller BEARINGS Size 6" to 60"

For excellence in production of extremely precise, unusually large ball and roller bearings.

THE KAYDON ENGINEERING CORP.

McCRACKEN STREET • MUSKEGON, MICH.

Specialists in Difficult Manufacturing

CENTER SCOPE

. . . ALWAYS ACCURATE

. . . SHORTENS LOCATING TIME

Better work at lower costs — is the universal report from shops using Center Scope, the optical locating tool. Job time estimates are being reduced, because Center Scope makes locating time shorter and gets more work out of each machine tool, from bench drill to lathe or jig borer.

Center Scope can be used without technical knowledge or training, and produces accuracy of plus or minus .0001" or better the first time an operator uses it.

Used on any machine tool, it is a precision instrument, not affected by wear, temperature, or mechanical pressure.

Center Scope has many major functions applied to general machine shop work and to special and individual jobs.

Prices are attractive, too. Variable Center Scope, only $97 f.o.b. Los Angeles; Edge Block, $23 additional. Other models slightly higher. For full information, write for Bulletin No. CS301.

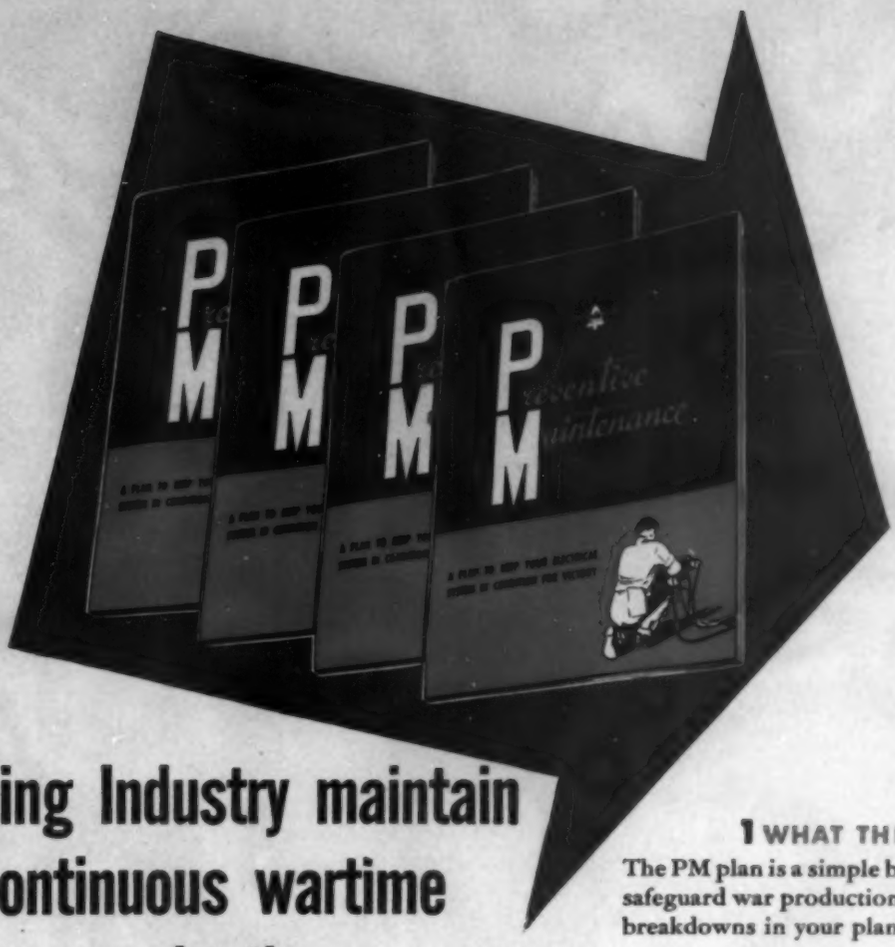
You've done your bit. Now do your best.

Buy a War Bond — TODAY

Rotary Head Milling Machine
•
Autometric Jig Borers
•
Center Scope

Kearney & Trecker
Products
CORPORATION
Milwaukee, Wisconsin
Subsidiary of Kearney & Trecker Corporation

Milwaukee Face Mill Grinder
•
Milwaukee Midgetmill
•
Milwaukee Speedmill



Helping Industry maintain continuous wartime production

OVER 11,000 PM MANUALS

Though introduced only recently, Anaconda's Preventive Maintenance Plan is already helping many plants maintain continuous production by keeping their electrical systems operating *efficiently*—despite shortages in essential wiring equipment.

To date, over 11,000 Plan Manuals have been sent to industrial concerns alone. Plant management is using them to protect the electric wire and cable on hand . . . to see that these vital copper products are being properly used . . . to detect hidden electrical weaknesses that can be corrected.

1 WHAT THE PLAN IS

The PM plan is a simple but comprehensive way to safeguard war production by preventing electrical breakdowns in your plant *before they can develop.*

2 HOW IT WORKS

The plan provides a practical means of making a periodic, systematic analysis of circuits and equipment. Uncovers potential weaknesses . . . suggests ways to correct them . . . prevents overloading of lines. Your own maintenance staff or electrical contractor can readily put the plan into operation.

Data thus gathered aids local W.P.B. Branches in reaching decisions on your requests for materials to *prevent* accidents.

3 HOW THE PLANT BENEFITS

The PM plan helps uncover weak spots in your electrical system *before* trouble develops. Provides practical "tools" to forestall—as well as foresee—would-be work stoppages. Helps maintain continuous wartime production.

If you aren't already utilizing the Anaconda Preventive Maintenance Plan, mail the coupon for full details.

42254A

"Tomorrow may be too late . . . do it today!"

ANACONDA'S PREVENTIVE MAINTENANCE PLAN

ANACONDA

Anaconda Wire & Cable Company
25 Broadway, New York City

Please send copy of the Anaconda Preventive Maintenance Plan for safeguarding wartime production.

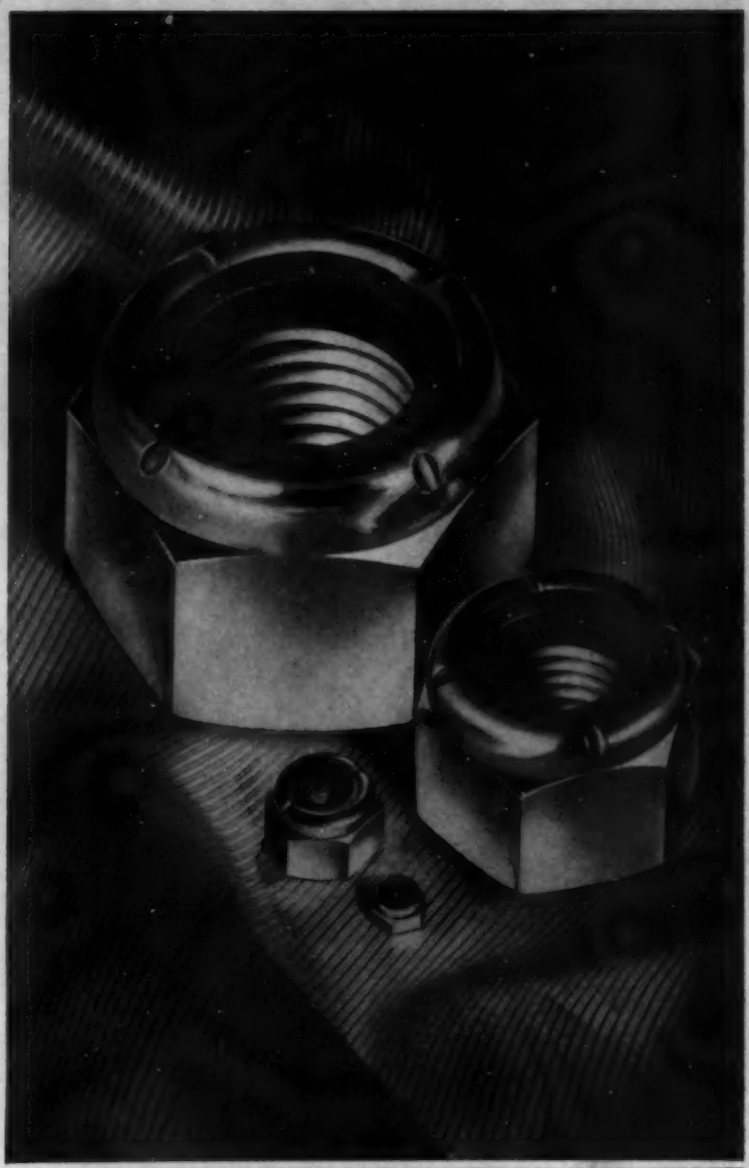
Individual .....

Company .....

Address ..... City .....

7P

They're the NUTS for tough fastening jobs



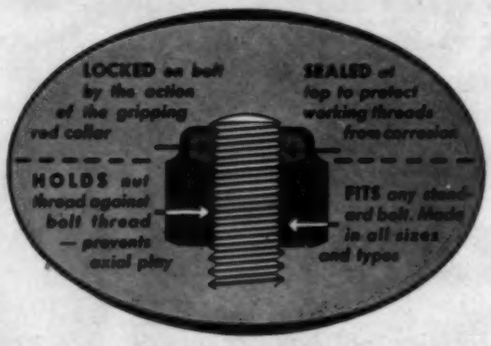
There are more Elastic Stop Nuts in America's planes, tanks, guns, naval vessels and production equipment than all other lock nuts *combined.*

All because these nuts stay put.

The reason is the red elastic locking ring in the top. This grips the bolt and holds the threads in pressure contact. And chance of wobbling and axial play is eliminated.

Looking ahead, we see better products and manufacturing equipment — we see time and money saved in maintenance and replacements — all because of these nuts that have proved they hold fast even under grueling vibration — that are easy to put on and take off yet lock automatically anywhere on the bolt.

Our engineers, experienced in solving fastening problems both in peace and war, are ready to share their knowledge with you. They will gladly work with you and recommend the correct Elastic Stop Nut to meet your need.


LOCKED on bolt by the action of the gripping red collar
SEALED at top to protect working threads from corrosion
HOLDS out thread against bolt thread — prevents axial play
FITS any standard bolt. Made in all sizes and types

ELASTIC STOP NUTS

Lock fast to make things last

ESNA TRADE MARK

ELASTIC STOP NUT CORPORATION OF AMERICA
UNION, NEW JERSEY AND LINCOLN, NEBRASKA

POWER

. . . 1500 TONS OF IT!

Largest Defense Plants are using this powerful Watson-Stillman Hydraulic Press for heavy metal-forming work—such as straightening connecting rods between dies. Other hydraulic machines built by Watson-Stillman for all kinds of metal-working jobs, are ready to help you solve your post-war manufacturing problems. Consult W-S engineers NOW, and avoid possible delay later. The Watson-Stillman Co., Roselle, N. J.

SPECIFICATIONS

- **Pressure 2750 lbs. per square inch.**
- **22 in. Stroke.**
- **37 in. Opening.**
- **Clear Platen Area—48 in. x 42 in.**
- **ADVANCE SPEED 650 in. per min.**
- **PRESSING SPEED 10.5 in. per min.**
- **RETURN SPEED 650 in. per min.**
- **Floor space—8 ft. x 6 ft.**
- **HEIGHT OVERALL—19 feet.**

*For Victory *** Let's all be Scrappers*

WATSON-STILLMAN

Hydraulic Equipment, Valves, Forged Steel Fittings

ZINC

GOES PLACES IN WAR

★ This war is being fought in high gear. On every front, hard-hitting mechanized equipment from tanks to trucks, carries the fight to our enemies.

Here too, zinc is vital. At least two slabs are required for every General Grant or General Lee tank, one to four slabs for every armored car, at least a slab for every infantry carrier truck, every transport truck, every ambulance and every ten jeeps.

To meet this demand we have greatly expanded our facilities . . . devoted every effort to supply the zinc so vital to war. Tomorrow the industries of peace will benefit . . . for we will be able to supply a more complete line of zinc metal than ever before.

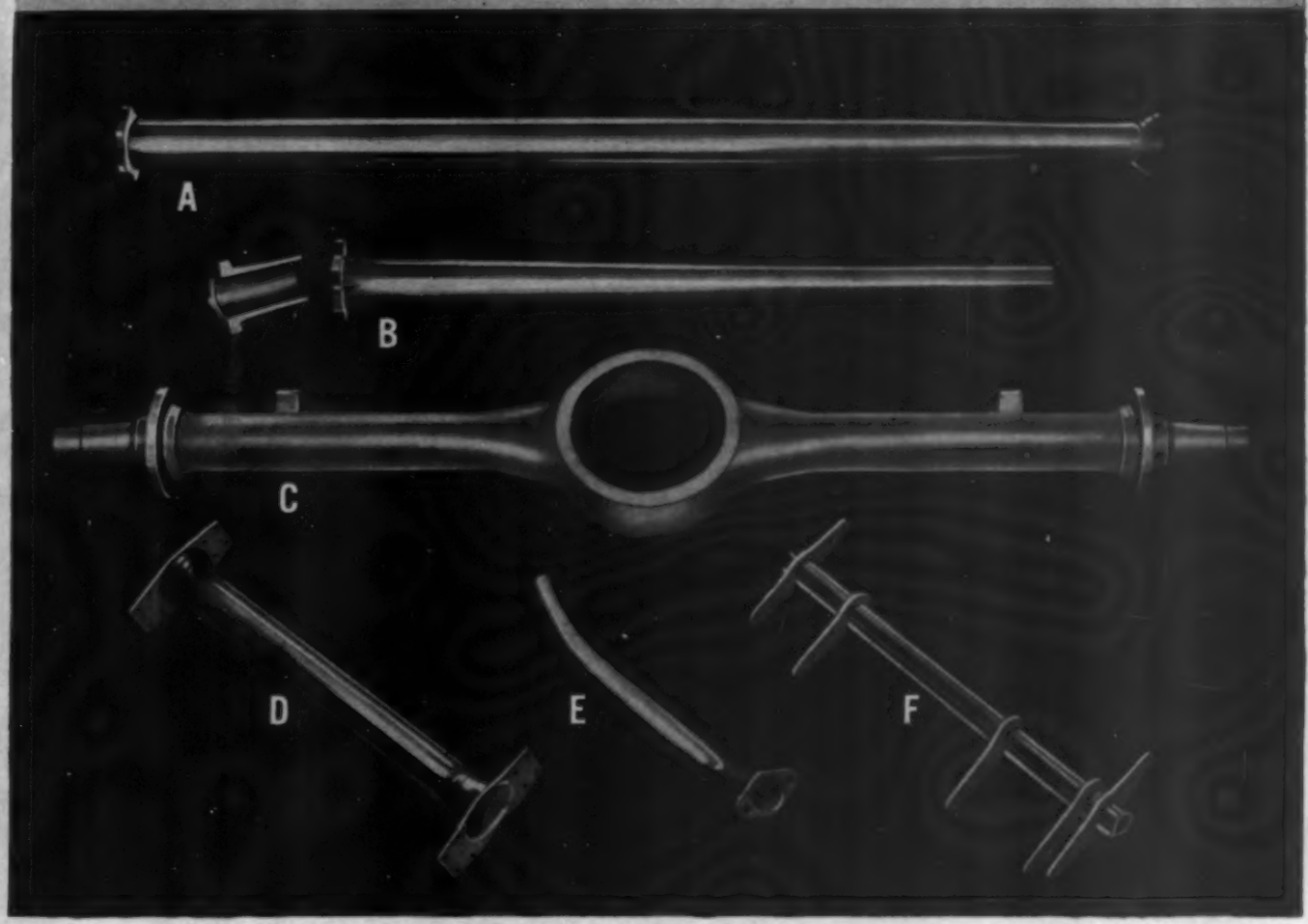
EVERY GRADE OF ZINC FOR WARTIME REQUIREMENTS

PRIME WESTERN
★
SELECT
★
BRASS SPECIAL
★
INTERMEDIATE
★
HIGH GRADE
★
SPECIAL HIGH GRADE

AMERICAN ZINC SALES COMPANY
Distributors for
AMERICAN ZINC, LEAD & SMELTING CO.
COLUMBUS, OHIO · CHICAGO · ST. LOUIS · NEW YORK

AMERICAN METAL PRODUCTS COMPANY

Manufacturers of Welded Steel Tube, Tubular Parts and Assemblies for the Transportation Industry



DESCRIPTION OF PARTS: A—One Piece Torque Tube. B—Torque Tube. C—Rear Axle Housing. D—Frame Rear Cross Tube. E—Spare Wheel Carrier Arm. F—Brake Cross Shaft.

We are serving transportation manufacturers in war, as in peace, with quantity produced welded-steel tubular parts made by the hot and cold process . . . upsetting, forming, swaging, forging, welding, heat treating and machining.

AMERICAN METAL PRODUCTS COMPANY, 5959 LINSDALE AVE., DETROIT, MICHIGAN

FARQUHAR HYDRAULIC PRESSES

Straightening steel tubes for composite rear axle housings.

Mack Truck Company find their Farquhar Hydraulic Straightening Press of inestimable use in their truck building and war fabricating work. To quote their exact words:

"The Farquhar Hydraulic Press we have has been in constant use since April, 1942; it is used on various straightening operations such as forgings, welded steel fabrications, etc.

"At present the press is being used to straighten axle forgings, and lining up Powder Can Retainers, the latter a welded steel fabrication. It is also used to camber axles.

"In general the press functions very satisfactorily, and works smoothly and efficiently. In other words, it does its job well."

Farquhar builds all types of self-contained Hydraulic Production Presses in capacities from three to 7,200 tons . . . builds for war today—ready for peace tomorrow.

Farquhar

ARMY E NAVY

- HYDRAULIC PRESSES
- MATERIAL HANDLING CONVEYORS
- SPECIAL MACHINERY

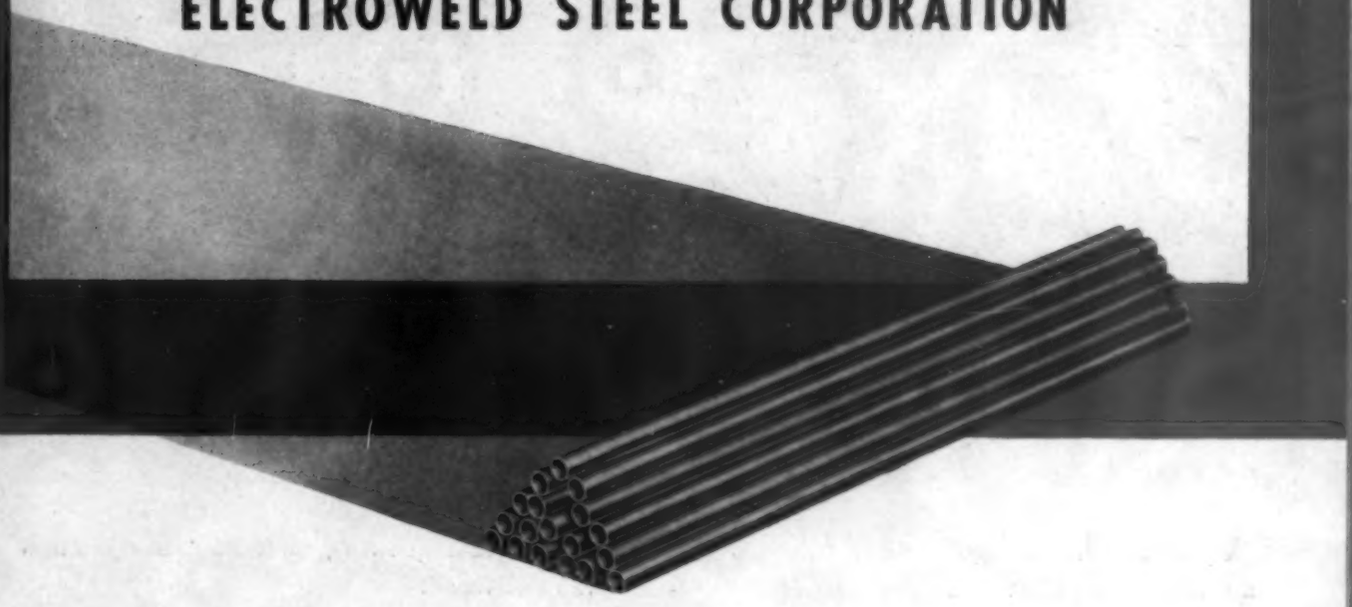
A. B. FARQUHAR CO., Limited . . . York, Pennsylvania

TALON, INC.

Steel Tube Division

Successors to

ELECTROWELD STEEL CORPORATION



TALON STEEL TUBE DIVISION manufactures pressure and mechanical tubing on most modern and up-to-date equipment. These excellent production facilities, plus scrupulous care by skilled workmen during each operation, give you assurance that every length of tubing is uniform and has these important high qualities: uniform diameter, uniform wall thickness, uniformity of structure in the weld area, plus square and uniform cuts which permit savings of real importance.

Talon's Steel Tube Division has a substantial capacity devoted entirely to the war effort . . . another mill, now under construction, will increase even further Talon's production of steel tubes. When victory be ours, we believe that this excellent product will prove advantageous in your peacetime production operations. . . . . .

TALON . . . . . INC.

STEEL TUBE DIVISION — OIL CITY, PENNA.

LIKE MAGIC OVERNIGHT . . .

Joshua Hendy Iron Works Becomes World's Largest Manufacturer of Marine Engines

A year and a half ago Joshua Hendy's was an obsolete plant nestling peacefully beneath California's sunshine at Sunnyvale. With the war came a tremendous demand for ships . . . and more ships . . . American ingenuity was again brought to life at Joshua Hendy's Iron Works.

This plant received an initial order for ten 2,500 h.p. vertical triple expansion steam engines for Liberty ships. From here on Joshua Hendy's production record is full of magic—today upwards of 6,000 employees are working on steam and marine turbines—and just a few months ago the 300th engine for the fast growing fleet of Liberty ships was delivered.

Such performance exemplified American determination and progress . . . which in time will defeat the Axis powers, insuring for us the continued blessings of a great American democracy.

In hundreds of America's industrial plants, Plymouth Locomotives are keeping loads moving efficiently and economically. There is a range of sizes to meet your demands, 2½ to 70 tons. If you have a haulage problem, write for details.

PLYMOUTH EMPLOYEES ARE "TEN PER CENTERS"

PLYMOUTH LOCOMOTIVE WORKS

Division of THE FATE-ROOT-HEATH COMPANY · · · PLYMOUTH, OHIO

Meehanite Foundries

Allentown, Pa.
Traylor Engineering Company

Ansonia, Conn.
Farrel-Birmingham Co., Inc.

Bridgewater, Mass.
The Henry Perkins Co.

Brooklyn, New York
E. W. Bliss Company

Buffalo, N. Y.
Pohlman Foundry Co., Inc.

Charleston, W. Va.
Kanawha Manufacturing Co.

Chattanooga, Tenn.
Ross-Meehan Foundries

Chicago, Ill.
Greenlee Foundry Company

Cincinnati, Ohio
Cincinnati Grinders Incorporated
The Cincinnati Milling Machine Co.

Cleveland, Ohio
Fulton Foundry & Machine Co.

Denver, Colo.
The Stearns-Roger Mfg. Co.

Detroit, Mich.
Atlas Foundry Co.

Flint, Mich.
General Foundry & Mfg. Company

Hamilton, Ohio
The Hamilton Foundry & Machine Co.

Hamilton, Ontario, Canada
Otis-Fensom Elevator Company

Irvington, N. J.
Barnett Foundry & Machine Co.

Jeannette, Pa.
Elliott Company

Lewisburg, Tenn.
Marshall Stove Company

Los Angeles, Calif.
Kinney Iron Works

Milwaukee, Wis.
Koehring Company

Mt. Vernon, O., Grove City, Pa.
Cooper-Bessemer Corporation

New Rochelle, N. Y
Meehanite Metal Corporation

New York, N. Y.
The American Brake Shoe Co.

Oakland, Calif.
Vulcan Foundry Company

Orillia, Canada
E. Long, Ltd.

Philadelphia, Pa.
H. W. Butterworth & Sons Co.
Florence Pipe Foundry & Machine Co., (R. D. Wood Company, Selling Agents)

Phillipsburg, N. J.
Warren Foundry & Pipe Corp.

Pittsburgh, Pa.
Rosedale Foundry & Machine Co.

Portland, Oregon
Crawford & Doherty Foundry Co.

Rochester, N. Y.
American Laundry Machinery Co.

St. Louis, Mo.
Banner Iron Works

St. Paul, Minn.
Valley Iron Works

Seattle, Washington
Washington Iron Works

London, Eng.
The International Meehanite Metal Co., Ltd.

Waterloo, N. S. W.
Australian Meehanite Metal Co., Ltd.

Johannesburg, South Africa
Meehanite Metal Co. (S.A.) (Pty.) Ltd.

The Meehanite dies shown open above, rigidly hold sheet airplane propeller blades to prevent distortion during quenching.

Meehanite QUENCHING DIES *speed propeller production*

A critical operation in the manufacture of hollow steel propeller blades for airplanes by the American Propeller Corporation, Toledo, Ohio, is quenching the blades during the heat treatment. This gives a hard surface to resist the pitting action of sand, dust, etc. To prevent distortion during quenching the blades must be held firmly under pressure in dies, through which cooling water flows in cored passages.

For the quenching dies shown above, Meehanite was used because its smooth, uniform, dense surface is an important advantage. In addition, the fact that Meehanite can be cast accurately to size and shape reduces the finishing operations required in making the dies, and assures correctly proportioned cored openings.

This application indicates how the special qualities of Meehanite are utilized in various industrial manufacturing processes. Perhaps Meehanite could solve a problem for you. Write for full information on the various types.

MEEHANITE RESEARCH INSTITUTE · New Rochelle, N.Y.

MEEHANITE
SEND FOR BOOKLET

Bulletin No. 11 "Meehanite the Metal for Cast-to-Form Dies"

ANSWERING THE CALL FOR

"Steel-Faster!"

WITH
SHORTER TIME
FROM
HEAT *to* HEAT

SWINDELL
ELECTRIC ARC
MELTING FURNACES

★ TOP CHARGING . . .
★ SWINGING ROOF . . .
★ 4-POINT ROOF SUSPENSION
★ INTEGRATED CONSTRUCTION
of roof operating mechanism

SWINDELL-DRESSLER *Corporation*

DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES

PITTSBURGH, PA.

Here's a machine that helps to relieve

MANPOWER SHORTAGE

SIMPLIFIED DESIGN of this modern, motor driven lathe eliminates many costly features not required for a wide variety of turret lathe work.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Now Equipped with Automatic Indexing Turret

Concentrate highly skilled operators on complicated machines to handle only such jobs as demand top skill. Divert a wide variety of simpler operations to the Oster No. 601 "RAPIDUCTION" Turret Lathe which does the work equally well but with less experienced operators.

That formula, simple as it sounds, has proved to be an effective solution to the growing problem of "MAN POWER SHORTAGE" of highly skilled workers who can't be "duplicated" with novices crammed with a few weeks training.

But the same "novices" CAN be brought quickly to high standards of efficiency with the Oster No. 601 "RAPIDUCTION" Lathe. This modern, motor driven machine with its six-position turret now controlled by automatic indexing is doing multiple-shift work in scores of war production plants.

We're celebrating our 50th Anniversary by helping war production plants minimize the problem of MANPOWER SHORTAGE.

The form below is a convenient way of inviting us to "celebrate" in YOUR plant.

No Time Out to Celebrate Our 50th ANNIVERSARY 1893-1943

OSTER

THE OSTER MFG. CO., 2037 E. 61st ST., CLEVELAND, OHIO, U. S. A.

★ O.K. Oster. We're interested in the No. 601 machine. ( ) Send Catalog No. 601. ( ) Ask your nearest distributor to see us at once. (Check either or both of above requests.)

NAME .....

ADDRESS .....

CITY ..... STATE .....

DESPITE FAST-CHANGING SPEED

YOU may be coiling movie films, or drawing heavy steel strip. To insure uniform quality or gage and to prevent breaks and shutdowns, constant tension must be maintained throughout each run. In many such operations, tension control is a job for "the short circuit in harness"—the *amplidyne*.

The amplidyne can hold tension constant throughout acceleration, running, and deceleration, or in coiling where motor speeds must vary with the change in coil diameter. It can automatically synchronize the speed of the coil with the speed of the material moving toward it. It can limit speed to a safe maximum and it permits tension to be easily adjusted to meet different conditions from run to run.

In designing the amplidyne, G-E engineers ingeniously incorporated a short circuit, together with load-current compensation, making an instantly responsive amplifier which gives minute electric signals the strength to direct the heaviest machines. Eliminating vibrating contacts and other control devices, the amplidyne simplifies circuits, and also maintenance. It is as reliable, long-lived, and easy to handle as a conventional m-g set.

Our booklet, "The Short Circuit That Moves Mountains," tells how the amplidyne operates, and shows how it can be used to control speed, torque, position, and other functions in a wide variety of applications. Ask our local office for Bulletin GEA-4053. *General Electric, Schenectady, N. Y.*

AMPLIDYNES

GENERAL ELECTRIC

MESTA FORGINGS

14 Foot Reduction Gear Ring Used In Ship Propulsion, Forged In One Piece By Mesta

The Army-Navy "E" Flag with three stars, flies over the Mesta plant.

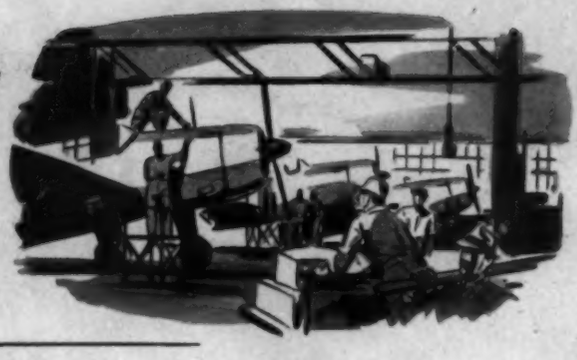
INVEST TODAY IN BONDS FOR VICTORY

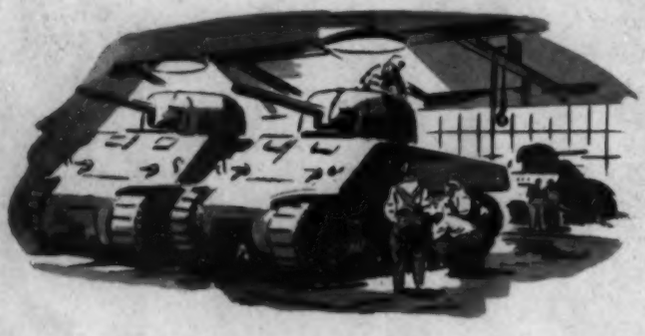
MESTA MACHINE COMPANY . . . . PITTSBURGH, PA.

PRODUCTION HEADACHES LESSENED WHEN YOU BUY TUBING FROM B&W

PRODUCTION-LINE TRAGEDY AVERTED

New to the game, the manutacturer of an aircraft part ordered tubing of a certain size from The Babcock & Wilcox Tube Co. Fortunately, but not by chance, B&W engineers insisted on seeing drawings of the finished part—proved that greater wall thickness was necessary—averted waste of time and tubing.





HEADACHE CURED

A manufacturer of tank parts, seeking savings of time and steel, switched from solid stock to cold drawn tubing and ran into trouble. B&W engineers showed how cheaper, easier-to-get hot finished tubing of a larger size would eliminate the trouble, enable far quicker tube deliveries and result in no greater overall cost.

DELIVERY SPEEDED

A one-time manufacturer of automobiles, faced with a new war-product manufacturing job, was advised to call in B&W. A meeting was held; designs were studied. B&W engineers recommended tube specifications and proved those specifications were right. 48 hours after that meeting, the material was in process.

When turning to a new job that requires tubing, remember that B&W engineers, imaginative yet practical, have helped many others solve new problems, perhaps startlingly similar to your own. Mere issuance of tube specifications may not get you the best tubing for your job. Instead, tell all you can about your tube use—requirements of the finished part—sequence of machining operations—how the tubing is to be chucked—heat treatment required—tube forming operations—etc. Thus, you'll get the B&W best.

TA-1235

BABCOCK & WILCOX TUBES

HOT FINISHED · COLD DRAWN · ALLOY STEELS · CARBON STEELS

THE BABCOCK & WILCOX TUBE COMPANY, BEAVER FALLS, PA.

DESPATCH FURNACES FOR ALL FERROUS HEAT-TREATING JOBS

275° to 1250° F.

720,000 LBS. IN 24 HOURS are heat-treated in a battery of four of these Despatch continuous conveyor furnaces. Now being used for ordnance equipment in a midwestern manufacturing plant, each furnace has a net load capacity of 7500 lbs. per hour.

CONTINUOUS CONVEYOR carries charge through workchamber 35 ft. long, 5 ft. wide and 3 ft. high. Conveyor has adjustable travel-rate.

ZONED HEATING, entirely forced convection, is supplied by dual gas-fired heating units. Twin high volume fan system brings cold charges to temperature quickly and keeps entire chamber uniform within + 5° F.

ASK FOR FULL DETAILS about furnaces of this type. Special literature, charts, photos sent on request.

NO HEAT TREATING JOB IS TOO TOUGH for a Despatch furnace, whatever the processing requirements. This true of *all* types, from the largest conveyors down to the smallest of pot models. And as thousands of documented field tests have proved, load after load may be processed in *any* Despatch furnace with dependable and *identical* results every time.

Numerous Standard Models Available

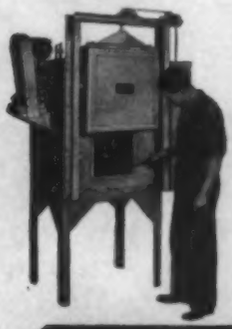
Despatch furnaces are available in many types so you can have just the model which fits most effectively into your plant layout . . . makes *best* use of labor, space and fuel . . . and which will do *all* the heat-treating jobs you require today, yet provide ample flexibility and capacity for the bigger jobs of tomorrow.

Special Models, expertly engineered to meet unusual requirements, are also readily available. Our engineering staff will be glad to advise you.

PROMPT DELIVERIES ASSURED

POT TYPE (DT) Despatch furnaces as used for heat-treating shell-cases. Ideal also for bearings, castings, pistons, dies, engine parts and similar equipment. Electric or gas-fired; range to 1250° F. Standard basket diameters from 12" to 60"

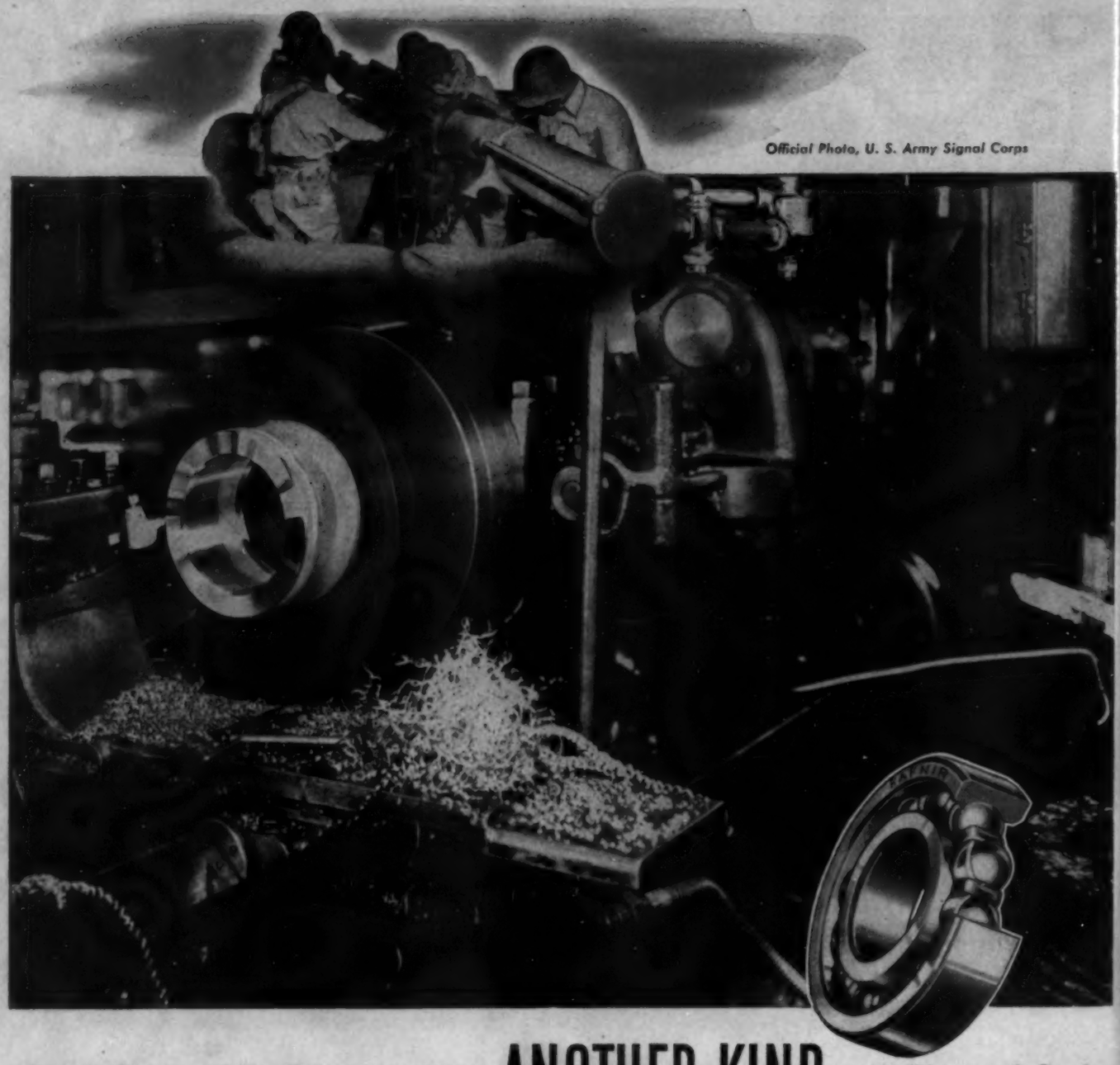
CAR-BOTTOM TYPE Despatch stress relief furnace, 13½"x13½"x 6½" inside. Gas fired and convection-heated. Automatic program control governs pre-heating, soaking and cooling cycles. Recommended for weldments castings and similar materials.



BOX TYPE (CF) Despatch furnace using the effective 100% convection heating system. For tools, dies, parts and small castings. Range to 1250° F. Improves quality, assuring correct Rockwell or Brinell every time. Ideal for production or laboratory use. Standard sizes from 13"x13"x13" to 36"x48"x 96".

PHONE OR WIRE TODAY
for prompt Despatch engineering service

DESPATCH OVEN COMPANY MINNEAPOLIS



Official Photo, U. S. Army Signal Corps

Getting the Range on ANOTHER KIND of Trouble!

A slight chatter in a machine tool in a Michigan factory may cause a machine gun to jam in Africa. An important piece of equipment forced out of action in Delaware may mean that a Marine in New Guinea runs out of ammunition. Discouraging the relentless attack of *trouble* is a matter of most serious concern throughout our great war industry, right now.

This need to eliminate troubles, slow-downs and breakdowns in these hard working machines is magnifying the importance of Ball Bearings! Friction-free Fafnir Ball Bearings were made to discourage these casualties. Their rugged stamina and Balanced Design . . . larger balls and deeper races . . . keep them on the job on machines whose work-day is 24 hours *every day*. Their in-built precision defeats chatter and deflections on machines that must hold tolerances on the button . . . month after month. The Fafnir Bearing Company, New Britain, Conn.

ARMY (E) NAVY

FAFNIR

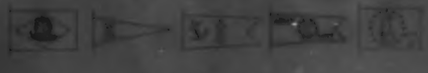
BALL BEARINGS

Problem:

Problem: How to get faster, safer, more economical materials handling.

Answer: Replace chains, hooks or slings with Heppenstall Automatic Safe-T-Tongs. Whether your handling problem includes loads like this or even loads like this ... makes little difference because Automatic Safe-T-Tongs are specially designed for each job. Safe-T-Tongs are fully automatic ... not power driven. This is the way they work: First you lower them on the object ...allow slack and the tongs unlock ...the tongs grip as they come up ...carry swiftly ...then as the load is placed, the tongs lock open again automatically ready for the next job.

Why not write for this highly descriptive book about tongs? It may give you ideas. Dept. M Heppenstall Company, Pittsburgh.



Heppenstall Automatic Safe-T-Tongs

When Johnny, Mike, Pete and Mary

come marching home!

THAT will be the Great Day when the victorious boys—and the girls—come back to the wide open arms of America.

A Great Day that isn't so far away.

They probably haven't realized it but Industry has found the time somehow, apart from its tremendous war effort, to plan and develop new things that will enhance and improve our future living.

New developments in metals and alloys, fuels, plastics, chemicals, rubber, foods, synthetics, textiles—and electronics which will be reflected in the coming higher standards of peace-time living.

Right now in thousands of laboratories—in pilot plants—on the drawing boards—in the conference rooms—Industry is experimenting, planning, discussing.

And in many of these almost revolutionary processes that are already under way or are being planned, super refractories by Carborundum are considered as vitally important factors.

If you, too, are working on or considering a new process involving the use of refractories, there is undoubtedly one or more Carborundum Brand Super Refractories that will improve the efficiency of your operation.

It may be that your conditions call for a refractory having high refractoriness or high heat conductivity.

Perhaps resistance to spalling or softening or great strength at elevated temperatures is most important.

Whatever the essential quality, characteristic or application may be, we are confident that super refractories by Carborundum and our research and engineering will prove invaluable.

We would welcome the opportunity of consulting with you.

CARBORUNDUM

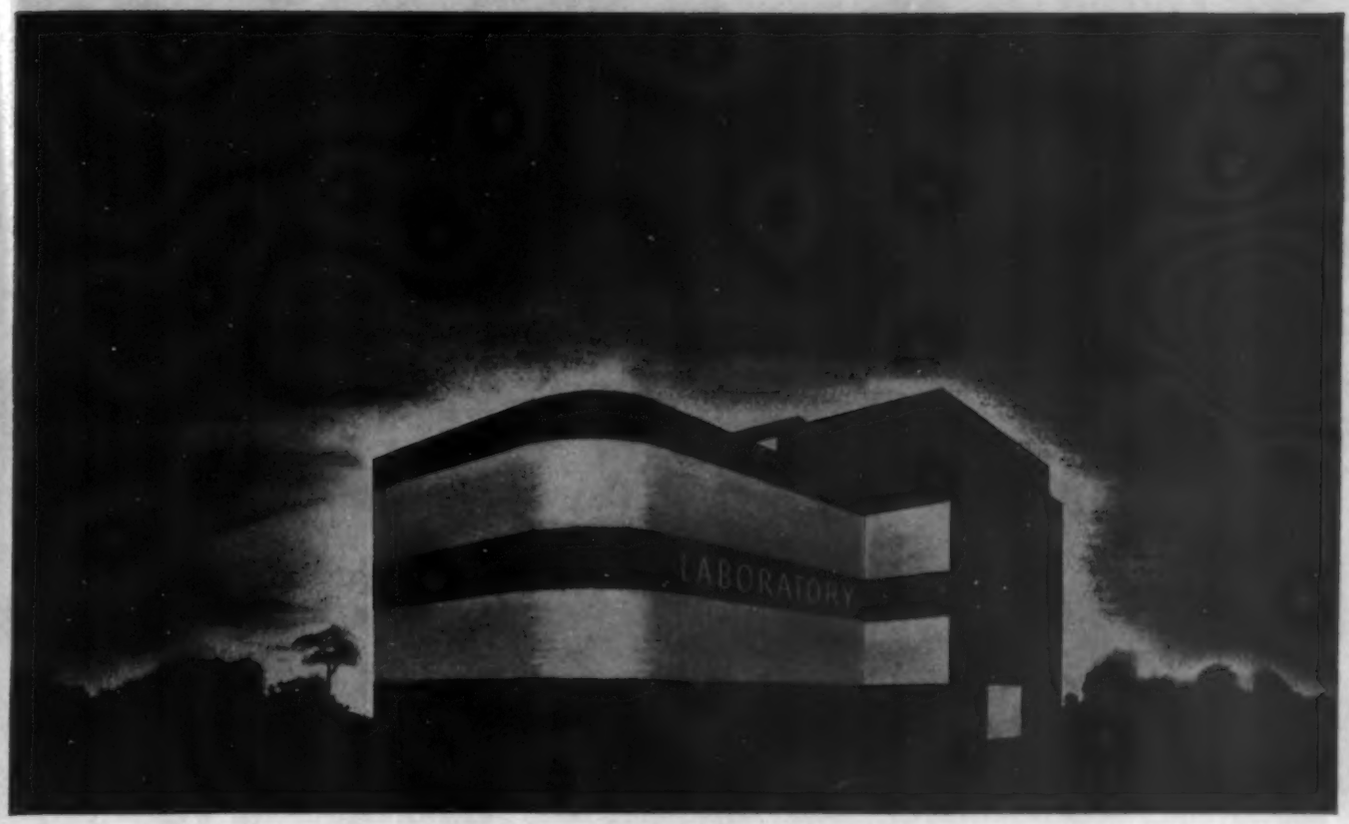
Refractory Division, **THE CARBORUNDUM COMPANY,** *Perth Amboy, N. J.*

REG. U. S. PAT. OFF.

MANUFACTURERS OF GRINDING WHEELS, COATED ABRASIVES, SUPER REFRACTORIES, HEATING ELEMENTS

District Sales Branches: Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh. Distributors: McConnell Sales and Engineering Corporation, Birmingham, Ala.; Christy Firebrick Company, St. Louis, Mo.; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Company, Los Angeles, San Francisco, Calif.; Denver Fire Clay Company, El Paso, Texas; Smith-Sharpe Company, Minneapolis, Minn.

(Carborundum is a registered trade-mark of and indicates manufacture by The Carborundum Company)



Tomorrow's Sheet Problems
are being solved today!

• Out of today's emergency are coming countless improvements in the manufacture of Republic flat-rolled steel goods to increase the salability and reduce the cost of your peacetime products tomorrow.

To meet the urgent demand for huge tonnages of better-than-ever flat-rolled steel for wartime requirements, Republic has developed new methods and improved manufacturing practices.

And the relentless research for which Republic has become noted continues. The lights that burn at night in Republic laboratories are blazing the way to better steels for you to work with tomorrow.

Your number one job today, like ours, is to speed the winning of the war. But men can work, do their tasks well and still think of the future. When that thinking involves the application or fabrication of flat-rolled steel products, include Republic in it. For here you will find a *COMPLETE* line plus the experience and knowledge that may mean added profits for you when you return to peacetime production.

REPUBLIC STEEL CORPORATION
General Offices: Cleveland, Ohio

Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company
Export Department: Chrysler Building, New York, N.Y.

Note these trade names for tomorrow's use

TONCAN IRON
(resists rust and corrosion)

ENDURO STAINLESS STEEL
(resists corrosion and heat—lustrous and sanitary)

ELECTRO PAINTLOK
(takes paint readily—holds it)

TONCAN ENAMELING IRON
(easy to fabricate and enamel)

TAYLOR ROOFING TERNES
(long service proved by 133 years' use)

REPUBLIC SILICON STEEL
(high-performance electrical steel)

EX-L-ITE TIN PLATE
(uniform high quality)

Republic
FLAT ROLLED PRODUCTS

A Problem in Electroplating and How It Was Solved

The Problem

An Eastern plating company had a contract for anodizing aluminum parts. The contract would be completed in about 9 months. The job would require a power supply of 500 amperes, 40 volts.

When, if ever, there would be another job requiring 40-volt equipment was uncertain. Most likely the next job would be low-voltage plating requiring 6 volts. The problem was: What equipment would serve both these widely different requirements.

The Solution

Here's how the needed flexibility was obtained: Seven standard 500 ampere, 6-volt G-E Copper Oxide Rectifiers were purchased. By a series connection and regulator control, this equipment was adapted to operate over a range from 1 to 40 volts at 500 amperes. When the contract was completed, the same equipment was relocated at two different points in such a way that 4 units were used for a plating job requiring 12 volts, 1000 amperes, while the other 3 units were set up on a job requiring 6 volts, 1500 amperes.

This illustrates only one of the many electroplating power supply problems that can be solved through flexible G-E Copper Oxide Rectifiers. Whatever your problem, General Electric Metallic Rectifier Engineers will be glad to consult with you. For additional information, write to Section A732-80 Appliance and Merchandise Dept., General Electric Co., Bridgeport, Conn.

GENERAL ELECTRIC

The new K type Navy blimp is able to fly at 80 miles per hour or to hover motionless over a lurking submarine. These airships have proved an efficient answer in protecting coastwise shipping against the undersea menace.

★★★ *Guardian Angel* OF THE CONVOY

Swinging majestically over the convoy, the blimps are proving an effective answer to the submarine menace. Sinkings have been practically eliminated in convoys so guarded.

Able to scan the ocean for miles, able to see below the waves, able to hover over the slowest tanker, or to fly at many times the speed of the fastest wolf pack, these guardian angels of the fleet owe much of their effectiveness to the engines that power them.

And in these Pratt and Whitney engines, as in every part of the ship, weight is a vital factor. To produce gears of the necessary lightness—of the extreme precision that this lightness, coupled with tremendous horsepower, demands—meant a new conception in gear manufacture. Today, these gears are being produced at Foote Bros. in amazing quantities.

The new manufacturing techniques, new production know-hows that make these lightweight, high-precision gears possible, will mean better performance and greater operating efficiency when they are applied to peacetime machines.

FOOTE BROS. GEAR AND MACHINE CORPORATION • 5225 S. Western Boulevard, Chicago, Illinois

FOOTE BROS.

Better Power Transmission Through Better Gears

5 *reasons why* you need X-Ray for War Production

Why consider it? X-ray provides the only means of non-destructive and foolproof internal inspection of parts and assemblies to control and improve quality.

War products demand it today; keen postwar competition between products and processes will demand it tomorrow.

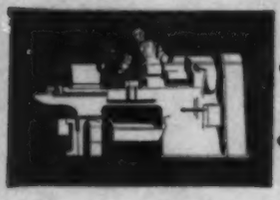
Is it complicated? Contrary to popular conception—no! Simplified controls, developed by Westinghouse, facilitate both training and operation.

In fact, X-ray greatly simplifies many production, design, inspection, analysis jobs.

Is it costly? Like any other modern production tool, industrial X-ray justifies its purchase price by reducing production costs and waste . . . insuring uniform quality and satisfied customers.

Consider these five "down-to-earth" reasons why you should consider X-ray as a necessary war production tool in your plant.

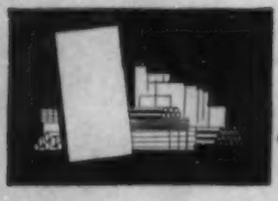
REASON ONE



SAVES MACHINE AND MAN HOURS

- Eliminates machining and assembly of faulty parts.
- Determines exact location and extent of faults in products or assemblies.

REASON TWO



CONSERVES CRITICAL MATERIALS

- Eliminates rejects. Weeds out bad units.
- Replaces "destructive" tests.

REASON THREE

SPEEDS PRODUCTION

- Easily quick-checks hidden assemblies.
- Permits use of high speed manufacturing processes . . . welding, die casting.

REASON FOUR

CONTROLS QUALITY

- Perfects techniques quickly for quantity production.
- Keeps quality consistent by pictorial comparison or check of all completed units.

REASON FIVE

HELPS TRAIN WORKERS

- Arouses worker interest by giving him exact picture of work he is doing.
- Provides accurate test of worker's qualifications. Serves as basis for visual education in training.

Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE

Look inside with X-ray

Typical Applications

Problem: A New England war plant, purchasing steel castings from an outside source, was experiencing a reject rate of 75% after machining. Three man-hours were lost on each rejected unit.

Solution: X-ray inspection.

Result: Defective castings detected before machining. Production accelerated. Tremendous saving effected in time, labor and materials.

Problem: Weight of bomber landing gear was excessive. Could weight be reduced without sacrifice of safety factor?

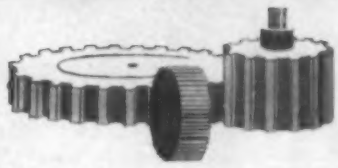
Solution: Analysis of stressed part with X-ray.

Result: Deadweight in casting safely reduced by 50%. Tons of critical material saved . . . load carrying capacity of plane increased.

Problem: Solenoid plunger in communications equipment wouldn't function properly. Engineers certified design as okay; factory said manufacture was okay; part appeared perfect.

Solution: Examination with X-ray.

Result: Picture disclosed that when machined, chromium plating on one side of plunger was heavier than on other—reducing its magnetic properties.



Problem: Inspectors questioned mesh and clearance between gears and housings in tab gear boxes for fighter planes. Only proof of accuracy was check of production drawings.

Solution: A look inside gear housing with X-ray.

Result: Inspectors given X-ray proof that each completed gear unit was constructed properly . . . or rejected before shipment.

Two Proposals

PROPOSAL NO. 1 Send for our new book on Industrial X-ray Inspection. The most complete book of its kind, it is packed with practical, understandable, question-answering information on how and where to use industrial X-ray inspection — how to set up an X-ray department — how to select the right equipment — range of equipment available. Ask for B-3159.

PROPOSAL NO. 2 If you want fast action on your problem just tell us to send a Westinghouse X-ray Specialist. He'll respond promptly—and competently.

Either way, mark the coupon and mail it to Westinghouse Electric & Manufacturing Co. East Pittsburgh, Pa., Dept. 7-N.

WESTINGHOUSE

X-Ray

a new versatile production tool

Mail this Coupon

Westinghouse Electric & Mfg. Co.,
Dept. 7-N, East Pittsburgh, Pa.

.....Send new Industrial X-ray Book B-3159

.....Send a Westinghouse X-ray Specialist

Name.....

Company.....

Address.....

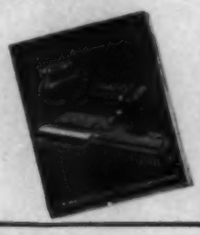
City.....State.....

Mallory Distributors Can Save You Time When Time is Important

Quick, complete information and prices for your purchasing department.

Application data for your engineering and design departments.

Service from stock.



A copy of the Mallory catalog for ready reference.

Lack of a few parts can wreck almost any production schedule. But when the needed parts are Mallory electronic products, the Mallory distributor is the man to turn to for help.

For example—one manufacturer discovered, just the day before scheduled use, that a number of selector switches required for the launching apparatus of a new aircraft carrier were missing. Something had gone wrong somewhere. But a wire to a Mallory distributor found him with the exact circuit arrangement in stock. The switches went out via air express and the carrier was launched on time.

Example Number Two—Navy Code Schools in two universities urgently needed a number of electronic products, among them Mallory switches and jacks, in order to inaugurate training of code operators on schedule. Something inexplicable had gone wrong and the parts were missing. Again, a Mallory distributor stepped into the breach to save the day in jig time.

Nothing very dramatic about this, it is true. But it demonstrates how Mallory distributors are geared to save time in furnishing essential electronic parts for essential uses . . . especially where small orders are concerned.

Where essential electronic parts are required—for maintenance, laboratory and testing devices, pre-production models—in short, where small quantities are involved, the Mallory distributor stands by to help. We are doing our level best to keep his stocks adequate. Proper ratings are needed? Certainly!

But make his acquaintance. He can be of service in many ways. If you do not know the name of the Mallory distributor nearest you, we will be glad to tell you.

P. R. MALLORY & CO., Inc. **INDIANAPOLIS, INDIANA** • Cable Address—PELMALLO

FLORI helps invasion. Recently we equipped invasion barges with fuel oil lines, sea water lines, bulk head connections, propeller skegs — an order of about 70,000 pieces completed ahead of rush schedule.

We can make anything in tubular or plate steel fabrication: Fabricated Piping — for steam, water, air, oil, gas, chemicals • Random mill or cut lengths, bent, coiled, welded, flanged, threaded • Valves, Pipe Fittings. *Send your inquiries.*

FLORI PIPING

THE FLORI PIPE COMPANY • ST. LOUIS—CHICAGO

★ WPB ORDER M-24C REQUIRES YOU TO

Classify Scrap at the Source-

SEGREGATE INTO THESE OFFICIAL CLASSIFICATIONS:

1. Nickel Steels (Ni 1%-2%) and Nickel-Chromium Steels (Ni 1%-2.25%) as 2100, 3100, 3200 series
2. Nickel Steels (Ni 2%-5.25%) as 2300, 2500
3. Nickel-Chromium Steels (Ni 2.25-5.25%) as 3300, 3400
4. Nickel-Molybdenum Steels (Ni 1-5.25%) as 46-4800
5. Ni Cr Moly Steels (Ni 1% and under) as 86-87-88-8900
6. Ni Cr Moly Steels (Ni 1%-5.25%) as 4300
7. Molybdenum Steels (Moly 0.15-0.65%) as 4000, 4100, 80-81-82-83-84-8500
8. Molybdenum Steels (Moly over 0.65%) as Mn-Mo Bullet Core
9. Chromium Steels and Chromium-Vanadium Steels (Cr 0.70-1.75%) as 52100-5100-6100

TOOL STEELS 10. Class A High Speed Steels (containing [1] at least 0.60% carbon and 3.0% Moly or [2] at least 0.60% carbon, not over 7.0% tungsten and at least 3.0% molybdenum) 11. Class B High Speed Steels (at least 0.55% carbon and 12% tungsten 12. Tungsten-bearing Hot Work Steels

CORROSION AND HEAT RESISTING 13. Chromium 10-14% inclusive 14. Chromium 15-18% incl. 15. Chromium over 18%. 16. Chromium 16-20% incl. and Nickel 8-10% incl. 17. Chromium 21-30% inclusive. Nickel 11-20% inclusive. 18. All other grades of corrosion and heat resisting alloy irons and steels containing chromium, nickel, molybdenum, cobalt, or copper.

Segregating scrap, as required under WPB Order M 24 C, is a difficult task, but it is absolutely necessary — there is no alternative. Production of fighting equipment made from alloy steels must not bog down.

War has shut the door on many sources of supply for essential elements, such as chromium, vanadium, nickel, which put the "fight" in steel. As a result, most of the alloys must be redeemed from the steel itself. For instance, in the manufacture of a precision part of an airplane, only 20 per cent of the original steel ingot is actually used. The other 80 per cent becomes scrap in the form of turnings and other by-products of the various machining and finishing operations.

Recovery of the essential alloys from machine turnings, chips, etc., would be comparatively simple if the elements could be separated in the furnace, but this is impossible. Scrap of unknown analysis may not only mean waste or loss of the alloys, but may ruin an entire heat of steel. Properly classified scrap saves alloying materials as well as manufacturing time.

To make enough alloy steel for the demands of war, scrap must be segregated and identified by the specific classifications outlined by the War Production Board. The only way this job can be done is at the source—your machines where the scrap turnings are produced. If you have not already done so, we urge you to review your shop procedure on the handling of scrap.

COPPERWELD STEEL COMPANY WARREN, OHIO

AIRCRAFT QUALITY STEELS · NITRALLOY STEELS
STAINLESS STEELS · BEARING QUALITY STEELS
CARBON TOOL STEELS · ALLOY TOOL STEELS

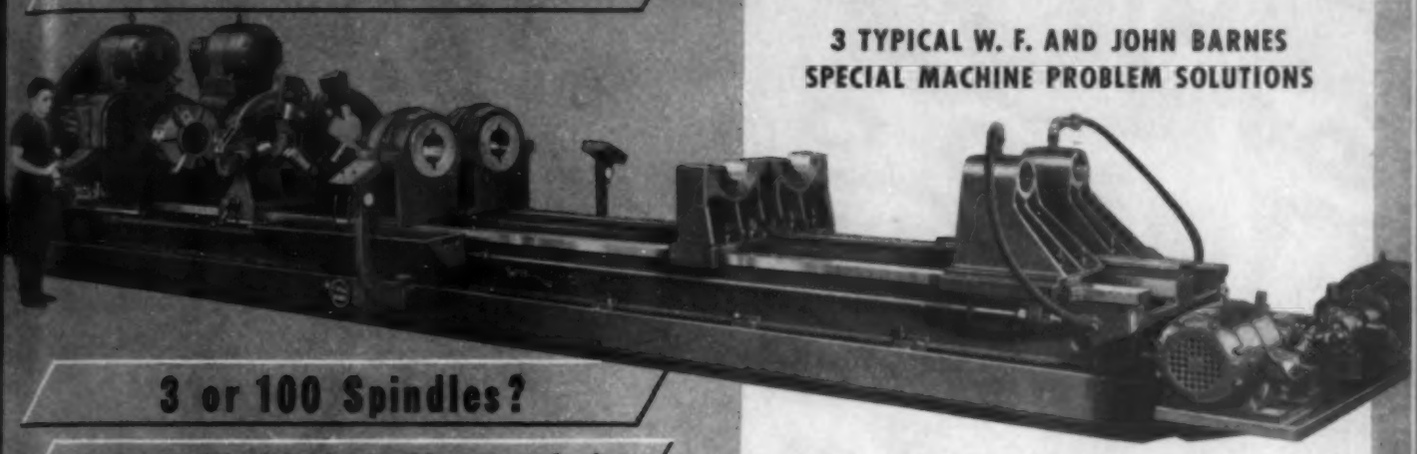
ARISTOLOY STEELS

WHAT SIZE MACHINE TOOL DOES *Your* PART REQUIRE?

1-Foot or 15-Foot Stroke?

3 or 100 Spindles?

1 or 7 Multi-Spindle Heads?



3 TYPICAL W. F. AND JOHN BARNES SPECIAL MACHINE PROBLEM SOLUTIONS

★ The usual factors governing the design of a special machine to suit your part are its size, shape, material, required operations, and required production. Obviously, when the part requires unusually large equipment, the machine designer and manufacturer must, in addition to engineering experience and skill, have sufficient *manufacturing and assembly capacity.*

As specialists in machine designing for both low and high production, W. F. and John Barnes Company has both the experience and capacity to build machines to suit most any part regardless of size. Their large, spacious plant is equipped with machines of capacity to machine the long heavy beds and other component parts required for large machines, and has ample assembly space for erecting and testing the equipment before shipment.

Experienced Engineers Available to Assist in Tooling

No matter what your product or your machining problems, if your manufacturing includes drilling, boring, milling, tapping or honing, you may find it profitable to use the W. F. and John Barnes Machine Design Service. Experienced engineers, familiar with processing methods, will analyze your problem, without obligation, to determine the most productive machining sequence. Just send part prints and production requirements for a preliminary estimate.

THESE 8 FREE BULLETINS WILL SHOW YOU HOW TO USE THIS MACHINE DESIGN SERVICE TO SOLVE YOUR MACHINING PROBLEM

Get these 8 bulletins today. Each traces a machining problem from the original production requirements to the final machine design. Each may suggest a tooling or production set-up that you can use today — valuable file information for tomorrow. Ask for bulletins 743.

12-Foot Stroke Two-Spindle Deep Hole Cylinder Boring Machine

This special machine, designed for boring the inner and outer cylinders of airplane landing struts, was completely assembled and tested on our new assembly floor before shipping. Maximum length of part is 67". Five different diameters varying from 8.344"/8.282" to 11.000" are bored using Tungsten Carbide Tipped Tools. Write for new bulletin 445C describing this machine.

Multi-Head 21 Spindle Drilling Machine

This multi-head special machine drills, faces, countersinks and taps the crankcase blower section of an aircraft engine. It has six machine units with a total of 21 spindles. This part was formerly drilled on standard single spindle drilling equipment and tapped by hand.

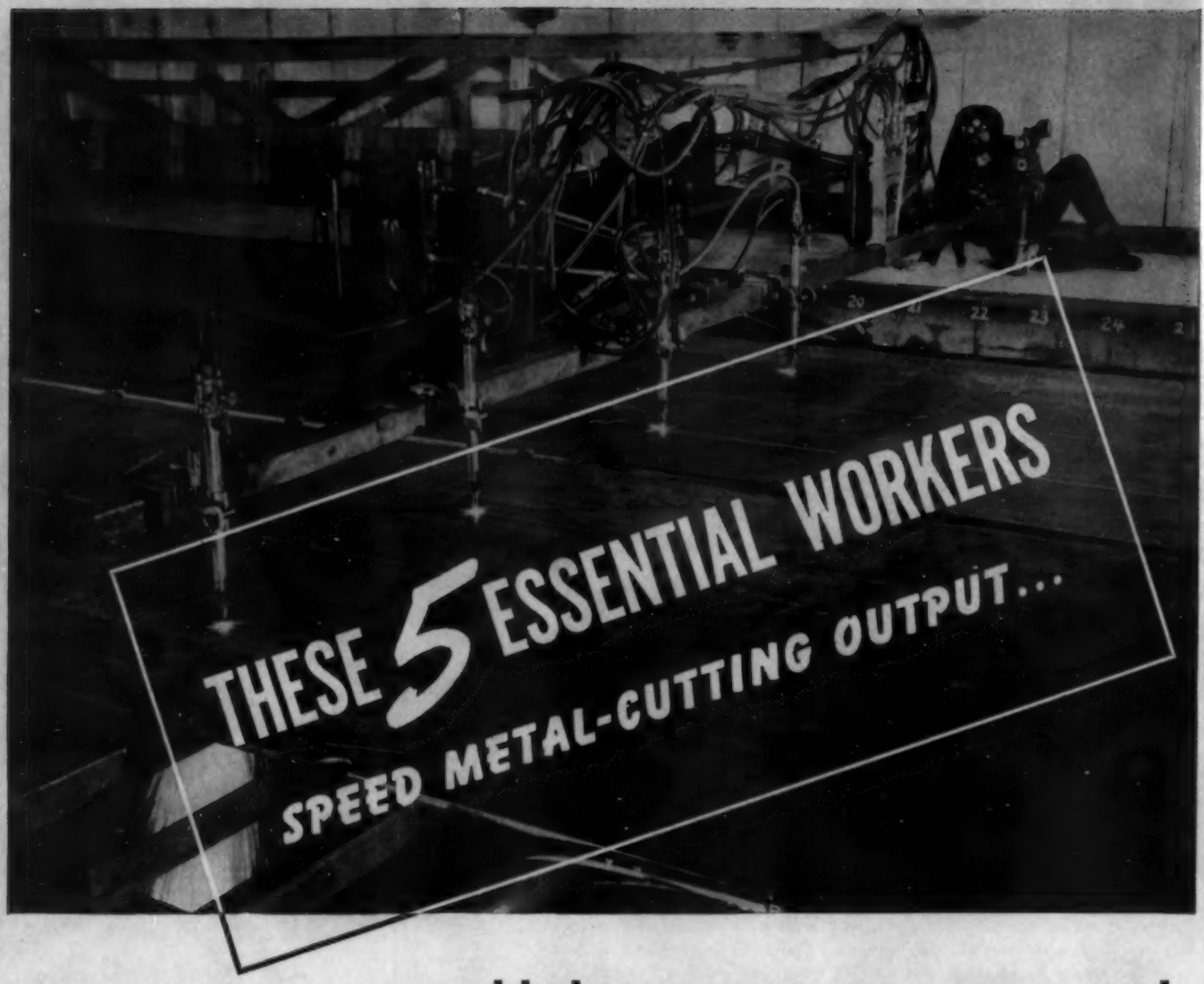
Special Facing Machine

This small machine further illustrates the ability of W. F. and John Barnes to design a machine, large or small, to suit a specific job. This machine was designed for a prominent washing machine manufacturer to face two bosses in a small cast-iron housing.

W. F. & JOHN BARNES

W. F. and JOHN BARNES

340 SOUTH WATER STREET • ROCKFORD, ILLINOIS, U.S.A.



and help ease your manpower needs

One man or woman operator, and four or more cutting torches on an Airco Travograph—that's an ideal way to meet your steel-cutting needs, and also partially simplify your manpower problem.

Many metal-fabricators are using this productive, multiple torch Airco gas cutting machine to shape large-area steel plates quickly and accurately—and help eliminate many manpower bottlenecks. Once the torches are lighted and cutting has begun, Travograph operation is almost wholly automatic.

The Travograph is motor-driven and moves on a track alongside the work. Movement of the cutting torches is controlled by a tracing device which follows a template of the part to be cut. Using multiple torches, regular shapes or intricate contours may be flame-cut in quantity out of the largest plates.

Both for today's need for speed and for post-war cost-savings, the Travograph offers valuable advantages. For complete details on this Airco gas cutting machine, call or write your nearest Air Reduction office.

AIR REDUCTION

AIRCO

General Offices:

60 E. 42nd STREET, NEW YORK 17, N. Y.

In Texas:

Magnolia-Airco Gas Products Co.

General Offices: HOUSTON, TEXAS

IDLE CYLINDERS ARE PRODUCTION SLACKERS: KEEP 'EM ROLLING FOR VICTORY!

Beading operations on a cement chute.

Forming a motor housing top.

Corrugating metal for bomb door.

Producing a 6-inch diameter cylinder.

The simplicity of design of Cleveland Steelwelds contributes to their simplicity of operation.

RUGGED FOR HEAVY PLATES AND ACCURATE FOR LIGHTER MATERIALS

Nothing need be added to the following paragraphs from a letter of the Fleming Sheet Metal Works, Los Angeles, Cal.

"Since we are a jobbing shop the material formed varies from 18 gauge up to ½-inch plate 7 feet long. From the time the presses were purchased we have formed 5000 ¼-inch plate enclosed channels 4 x 8 x 60 inches long; 2 or 3 thousand ¼-inch plate hatch coamings; hundreds of light gauge body parts, and thousands of bomb door corrugations.

"We have found the presses to be rugged for heavy plates and still hold accuracy for lighter materials. We run our presses from 8 to 16 hours per day 6 days per week. The Steelweld presses are entirely satisfactory and the simplicity of design contributes to the simplicity of operation."

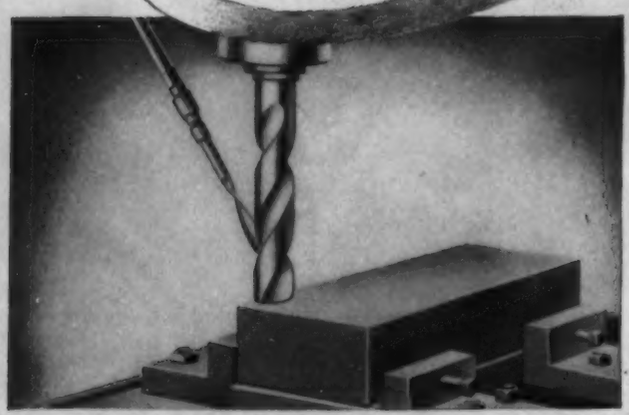
The illustrations show few of the many varied jobs to which Fleming has adapted its Cleveland Steelwelds that were installed two years ago.

GET THIS BOOK!
CATALOG No. 2002 gives complete construction and engineering details. Profusely illustrated

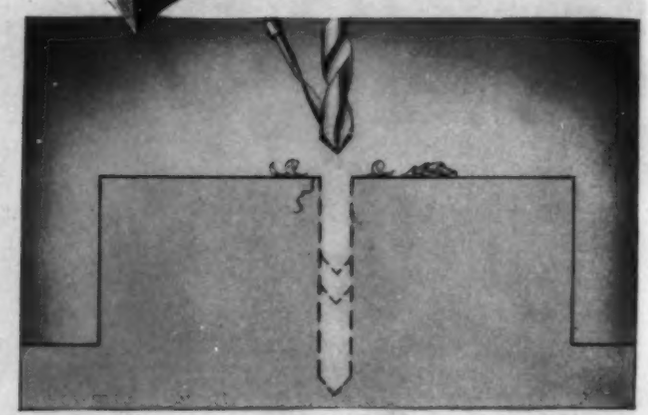
THE CLEVELAND CRANE & ENGINEERING CO.
1125 EAST 283RD ST. WICKLIFFE, OHIO.

CLEVELAND
STEELWELD PRESSES
GENERAL SALES AGENTS: THE CYRIL BATH CO., E. 70TH & MACHINERY AVE., CLEVELAND

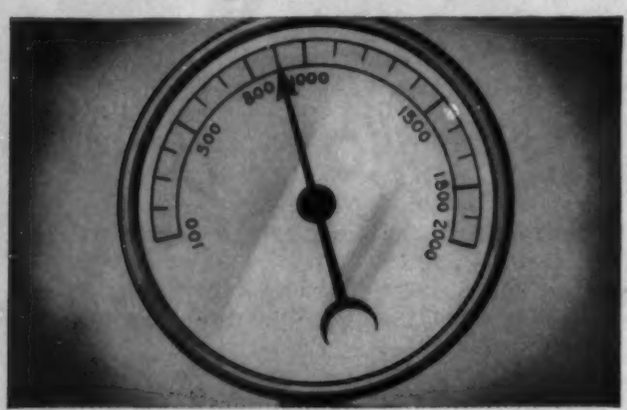
Helpful Hints for Drilling Tough Steel



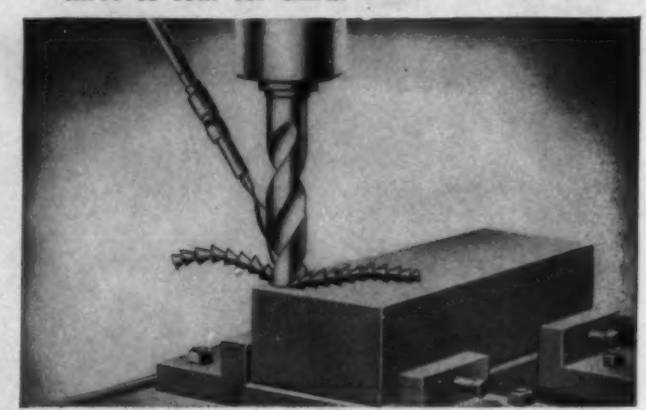
1. Use steady pressure and do not let drill ride without cutting. Back out the drill frequently to relieve chip congestion.



2. Back out when the drill has reached a depth three to four times the diameter of the drill for first insertion—one to two for second insertion —three to four for third.



3. To avoid drill breakage, always run at the proper speed. A 1/16″ center drill should run about 1800 r.p.m. (30 s.f.m.). A 1″ drill at 115 r.p.m. for same surface speed.



4. For deep drilling use a short spiral drill and Chillo No. 140 or 143, cut back with Amplex No. 00, further to reduce high temperatures. For shallow drilling use Chillo No. 90 or 93.

5. If you are faced with an unusual machining operation or if you are not satisfied with present results, call in a Cities Service lubrication engineer for consultation.

THE INDUSTRIAL HEAT PROVER

The Cities Service Industrial Heat Prover enables those engaged in the oxygen control of furnace atmospheres to achieve certain physical results desired in the processing of metal, or in the control of the amount of combustibles present. Recordings are continuous and almost instantaneous. For further information about this instrument, write to Cities Service Oil Company, Room 1663, Sixty Wall Tower, New York 5, N. Y.

OIL IS AMMUNITION—USE IT WISELY!

CITIES SERVICE OIL COMPANY

ARKANSAS FUEL OIL COMPANY

THE FOUNDATION FOR UNIFORM MEASUREMENT

DOALL Gage Blocks

Key to Mass Production

● In 1798 Eli Whitney went to Washington to demonstrate his idea of identical gun parts. Any part made in his shop was so accurate that it interchanged with the same part in any of his guns.

It was soon found, however, that his gun parts would not interchange with parts made by other gunsmiths, because no two shops had a common basis of precision measurements. For more than 100 years after that, there were no undisputed measuring devices.

By 1913, Gage Blocks were accepted by industry as the foundation of uniform measurement. Interchangeability of parts for any machine or equipment became possible between plants, states and even countries.

World War I was tooled up to 1/1000 of an inch; the needs of *this* war are accurate to 1/10,000 of an inch. When peace comes, these same accuracy requirements will carry over into mass production of civilian goods.

Metal working plants everywhere: Build Your Business on Today's Gage Block Standards. Have sets of DoAll Gage Blocks in each department to provide the necessary accuracies for tomorrow's interchangeability.

LOW COST KEYS TO PROSPERITY

Working Set, 81 blocks, accurate to 8 millionths of an inch, is adequate for average manufacturing uses.....$295.00

Inspection Set, 81 blocks, accurate to 4 millionths of an inch, recommended for tool room use and checking.....$350.00

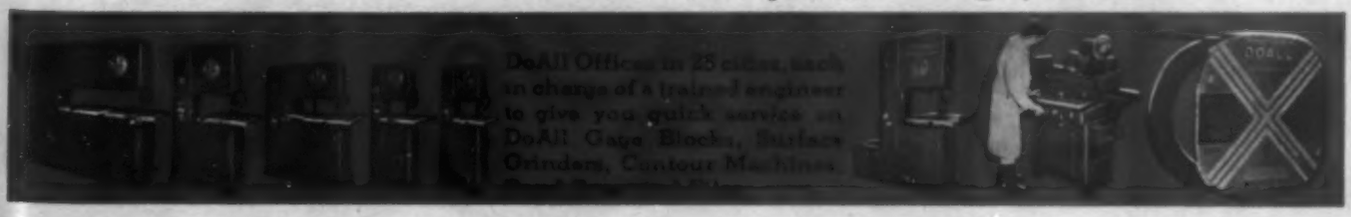
Laboratory Set, 81 blocks, accurate to 2 millionths of an inch, for use in a room with temperature controlled at 68° F $1450.00

Accessory Set, Laboratory instruments consisting of Master Surface Plate, Base Block, 4 sizes of Holders, Caliper Blocks, Center and Trammel Points, Vernier Gage, Master Squares and Parallels, Sine Bar with 3 straight edges, 2 Optical Flats and a Monochromatic Lamp. With this set you can build up snap gages and scores of setups for checking and inspection. In wood cabinet.....$495.00

FREE SOUND SLIDES—The DoAll man in your locality will gladly bring a portable projector to your plant and show a series of instructive slides on the Care and Use of Gage Blocks.

Write for interesting data about DoAll Gage Blocks.

SAVAGE TOOL COMPANY, Dept. S, Savage, Minn.


DoAll Offices in 25 cities, each in charge of a trained engineer to give you quick service on DoAll Gage Blocks, Surface Grinders, Contour Machines

No other material

Abrasion Resistance like this?

. . . Tanks must take a terrific beating! Imagine the grinding wear of high-speed combat in the heat and grit of desert sands. The battering impact of rocks and trees . . . and enemy equipment that has to be rammed. United States Steel is producing steels that take all this punishment and come back for more. Would steels like these help you design more rugged equipment for industry?

Toughness and Lightness like this?

. . . The "tin hats" our boys wear into battle are light enough for comfort but tough enough to give real protection against shrapnel and grenade fragments. In rigid Army tests, they withstand even a .45 bullet at close range. That's because the 1½-pound outer shell is tough alloy steel, developed especially for the job. This and thousands of other special alloy steels will be available for your future products.

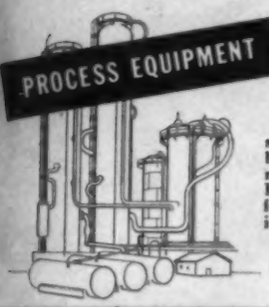
could stand the gaff!

It took Stainless Steel to make this war plane's exhaust manifold proof against corrosion and heat

THE "specs" for a fighter's exhaust manifold would read like a death sentence to most materials. They call for high corrosion resistance to withstand the action of doped fuels . . . heat resistance for the higher temperatures encountered in super-powered engines . . . fabricability for mass production . . . high strength-weight ratio for lightness . . . and good fatigue resistance to reduce repairs and replacements. U·S·S 18-8 Stabilized Stainless Steel meets all these requirements, and many more.

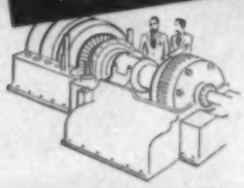
As your "designs for tomorrow" begin to evolve, keep stainless high on your check-list of materials. Its unequalled combination of properties makes this versatile steel a valuable design tool in many fields.

PROCESS EQUIPMENT



Process equipment, in such industries as petroleum refining, chemical manufacture and food packing, benefits greatly from the application of stainless steel. Product quality is improved, because stainless can be kept clean with minimum labor. Equipment lasts much longer, too. If your designs for the future are destined for these or related industries, you'll want to investigate the advantages of stainless.

MACHINE PARTS



Machine parts of stainless steel offer many advantages in equipment such as pumps, steam turbines, engines and compressors. Besides its high resistance to corrosion and heat, stainless has good machinability and can be produced with a high yield strength up to 140,000 p.s.i. It can be welded, drawn, punched, cut and formed with ease. When your future designs call for these qualities, don't forget that U·S·S Stainless Steels are made in the country's widest range of shapes and sizes.

What will your "Designs for Tomorrow" need to make them successful?

It would be unforgivable for military strategists to ignore the lessons learned on the battlefronts of this war. And it's just as important that future products be given the benefit of design lessons learned by observing the performance of wartime products in the line of duty.

You'll find steel proving its worth in hundreds of war applications. Airplane parts successfully running the gauntlet of stress and vibration and heat. Tank armor proving its toughness through days of short-range desert combat. Bullet clips of steel helping to feed a thousand shots a minute to the hot barrels of machine-guns. And on the production line, steel's versatility is helping to win the race against time.

So keep an eye on steel. Check its performance wherever you find it in action. Keep up-to-date on the advantages of new steels and new applications of steel. The chances are that you'll lick some of your most puzzling future design problems *before* they become problems.

U·S·S STEELS FOR DESIGN

Whether you are designing to meet the needs of today or tomorrow, we can help you select the right materials from these and many other U·S·S Steels:

U·S·S HIGH TENSILE STEELS *to resist corrosion and increase strength without adding weight.*

U·S·S COPPER STEELS *to give twice the atmospheric corrosion resistance of regular steel at little additional cost.*

U·S·S HOT-ROLLED AND COLD-ROLLED STEELS *to provide the basic advantages of steel, plus maximum economy in accordance with the needs of each job.*

U·S·S ABRASION-RESISTING STEEL *to combat wear and friction.*

U·S·S STAINLESS AND HEAT-RESISTING STEELS *to assure high resistance to corrosion and heat, and to reduce weight.*

U·S·S CARILLOY ALLOY STEELS—*Special steels for the special jobs of industry.*

U·S·S PAINTBOND—*A galvanized, Bonderized sheet that permits immediate painting and holds paint tighter.*

U·S·S VITRENAMEL—*Sheets designed especially for porcelain enameling.*

U·S·S ELECTRICAL SHEETS *for motors, generators and transformers.*

ONE AIM . . VICTORY
BUY BONDS

USS

ONLY STEEL CAN DO SO MANY JOBS SO WELL

CARNEGIE-ILLINOIS STEEL CORPORATION
Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Supply Company, Chicago, *Warehouse Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

HERE it is, ready for you. Twenty pages of tool-saving, time-saving, tool-crib arrangements used in many of the nation's busiest plants — who have problems like yours. Faced with a shortage of small tools, many plant managers have found that careful tool crib planning means more effective use of the tools they have. This book shows how they do it. This is not a book of theory — every photograph in it shows how a real plant has made a real saving. "Greenfield" wants you to have a copy, as part of our contribution to the united effort. Send your reservation today . . . use the coupon below.

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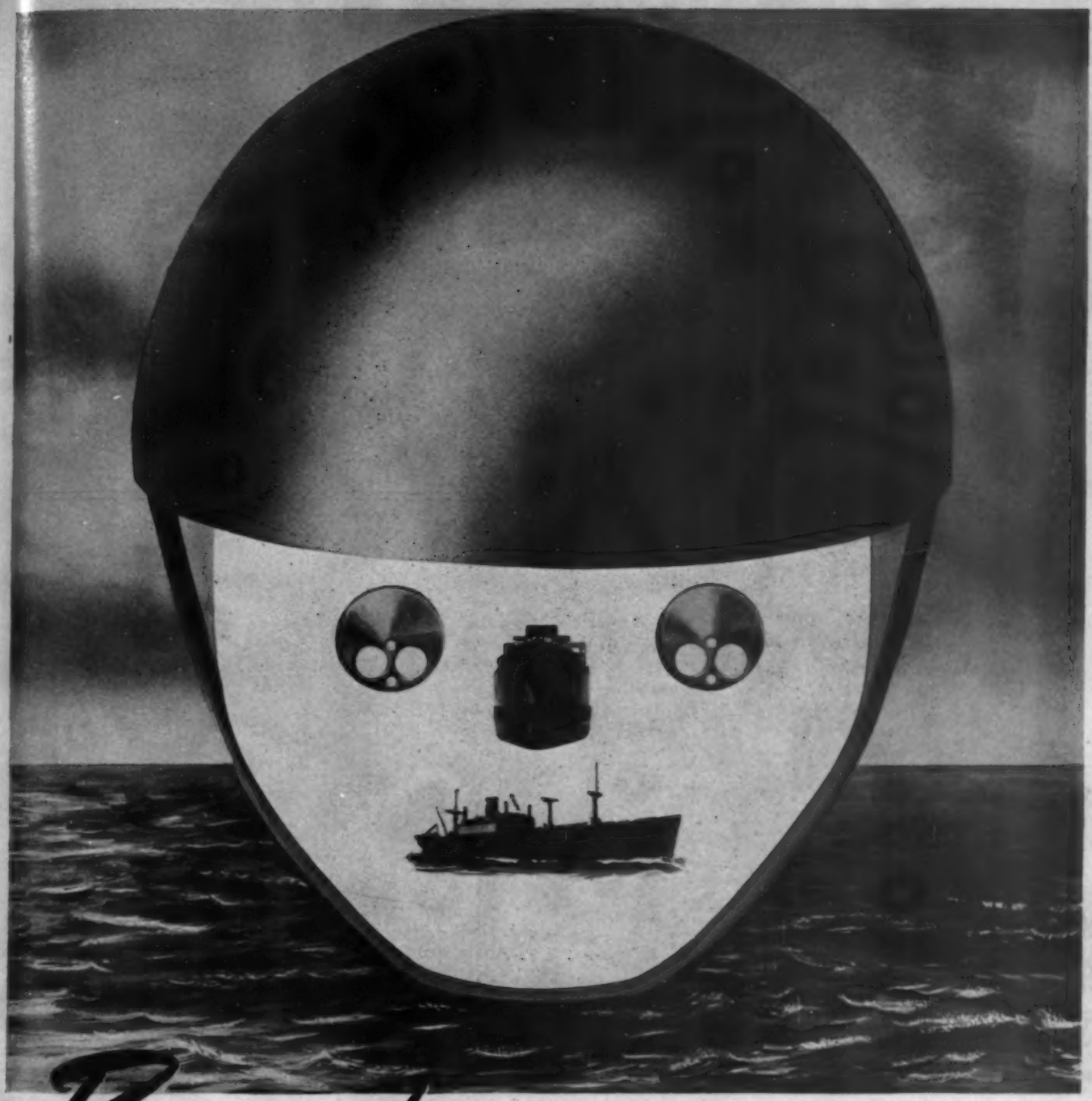

Bonnets FOR VICTORY SHIPS?

and plates too . . . Yes, Flanged & Dished Heads (steel helmets, if you like) to help keep captive the mighty steam pressures in the Boilers and allied equipment of Merchant and Naval Ships—

Sheared Steel Plates also by Worth for the Hulls, Bulkheads and Decks of War and Merchant Ships,—for the shells of their boilers, tanks and allied equipment, each a part of a part to win the War.

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Tail wheel assemblies, actuating cylinders and engine forgings. Brake lining. Camshaft and starter bearings.

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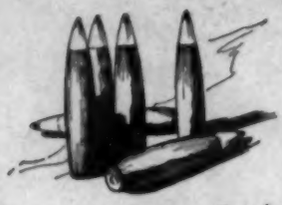

Shell and shot forgings. Cast bomb parts. Steel armor plate castings. Ammunition hoists. Torpedo parts.

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Crossings, switch stands, switch point locks, guard rails, rail lubricators. Trackwork for industrial equipment.

You Name the Part—

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Brake Shoe MAKES PARTS for original equipment and for maintenance; parts that are upset and drop forged; molded fabrics and plastics; ferrous and non-ferrous castings. In war, as in peace, Brake Shoe ships millions of parts to thousands of manufacturers, in many fields of industry.

The services of our research and development engineers are available for immediate or post-war problems.

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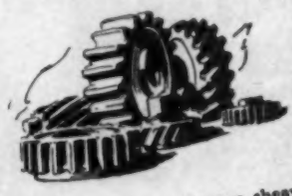

Manganese steel chain, gears, sheaves, sprockets and wheels. Hard surfacing welding rods. Forgings, castings.

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Air compressors. Car washers. Brake lining, fan belts, clutch facing, radiator hose, auto lifts.

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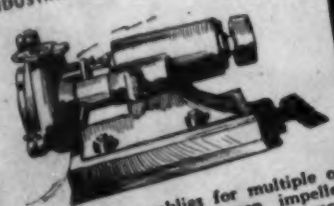

Complete assemblies for multiple or two van closed or open impeller type. Single stage self-priming pumps.

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Welding rods, flux, nickel-manganese filler, applicator bars. Welding products for repair of ferrous equipment.

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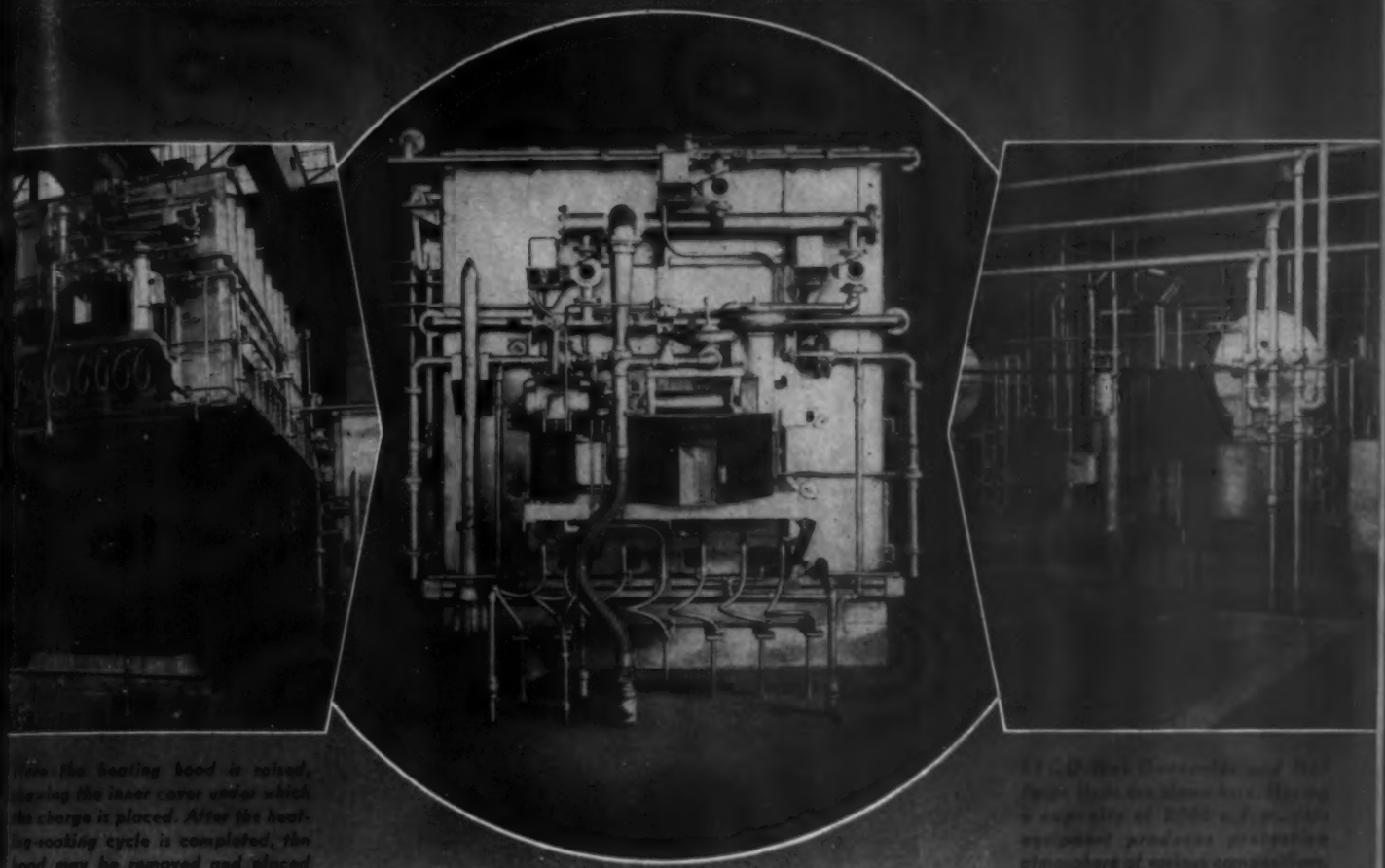
Strut and stern tube bearings. Carbon steel castings for davits and winches. Bronze castings for engines.

ANOTHER EXAMPLE OF SALEM ENGINEERING INGENUITY

ATMOSPHERE ANNEALING WITH DIRECT FIRING



...the heating hood is raised, leaving the inner cover under which the charge is placed. After the heating-cooling cycle is completed, the hood may be removed and placed on another charge, leaving the inner cover in position until the charge has finished cooling.

This shows the heating hood in place with thermocouples and fuel connections ready for operation. Notice the careful, clean-cut engineering construction.

...a capacity of ... pounds per ... special protective atmosphere of various compositions, each with its special, correct analysis for any annealing purpose.

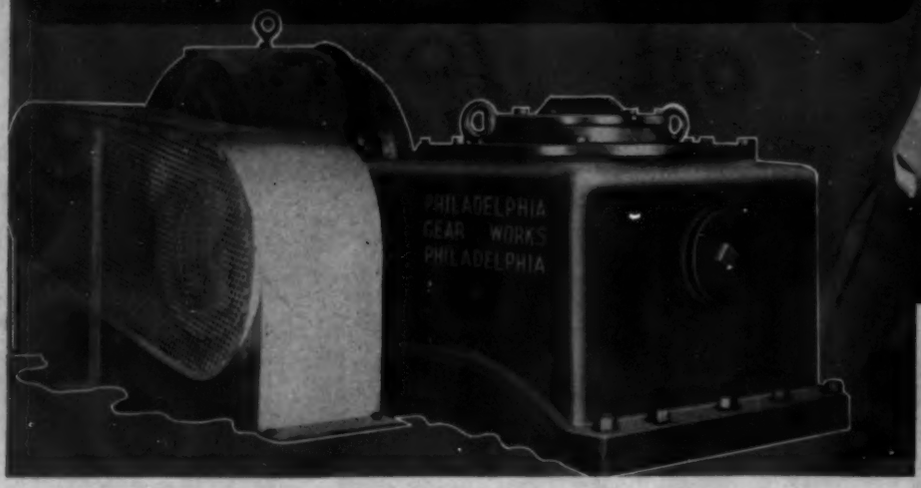
This Salem, direct-fired, protective-atmosphere annealing furnace will anneal high-carbon and low-carbon steel—bars, sheets, and strip. It is now being used to anneal SAE–52100 steel. Precisely controlled compositions of atmosphere may be varied to produce the correct analysis for each individual charge. Fired with gas at an operating temperature of 1450° F., this furnace has a capacity of 40,000 pounds of bar stock in one charge. The heating-soaking-cooling cycle is 20 hours.

Because Salem's method of direct-firing utilizes the full value of the heat, this furnace lowers cost of production and maintenance. The ingenious placement of Salem direct-firing burners creates swirling currents of heat which bathe the entire charge. This results in elimination of hot spots and provides precision controlled uniformity of temperature. Salem can help you solve any phase of your heat treating problems from design and engineering to building of equipment.

SALEM ENGINEERING COMPANY

SALEM ENGINEERING CO. · SALEM, OHIO

They want our recommendations for a vertical drive



Because of the completeness of the line of Philadelphia Speed Reducing Units we are able to furnish the type of drive best suited for practically any requirement. For example, the

Philadelphia MOTOREDUCER is adaptable to service where a compact, built-in motor and speed reducer is indicated. (View at right shows a MotoReduceR driving a horizontal mixer.)

Philadelphia Worm Gear Speed Reducers

are made in a vertical type for installations where it is advisable to have a separate motor and speed reducer. (Photo above shows a vertical type Philadelphia Worm Gear Reducer in a sugar refinery.) Other types of vertical Philadelphia speed reducers are also available for meeting special requirements. All Philadelphia units are made for dependable, economical and efficient operation.

Tell us your problems . . . our engineering staff will give you unbiased suggestions on the right unit for your purpose.

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LIMITORQUE VALVE CONTROLS

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LIMITORQUE CONTROL
operates all types of valves, etc., safely, economically, from convenient stations.

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The economical self-contained drive, Horizontal or Vertical types — various ratios and horsepowers.

Philadelphia
WORM GEAR SPEED REDUCER
right angle drives — vertical or horizontal. Wide range of ratios and horsepowers.

44 TONS
OF ALLOY STEEL IN
24 HOURS
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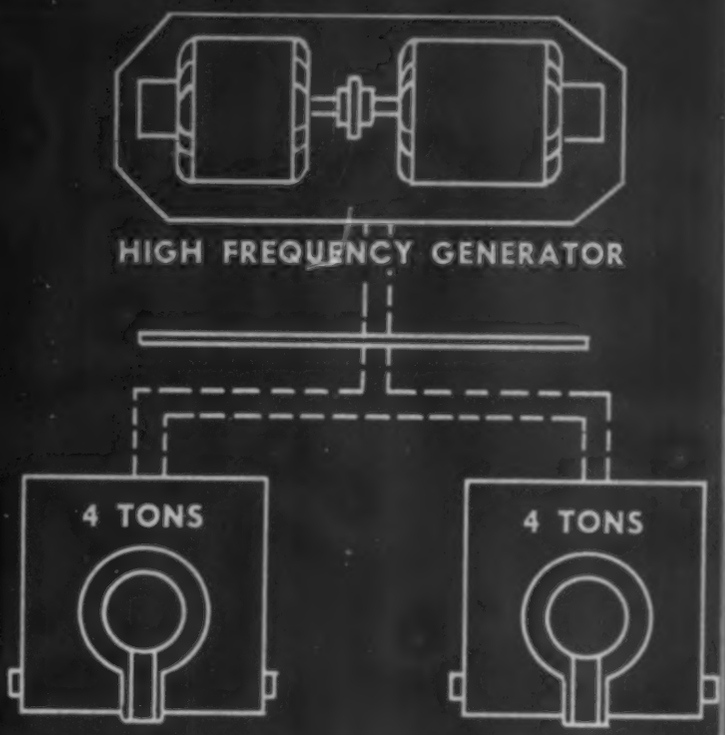

One high frequency generator and two 4-ton Ajax-Northrup Furnaces can melt and pour 11 heats or 44 tons of alloy steel in 24 hours.

Exact duplicate analyses, practically no loss of elements, automatic stirring, no contamination from electrodes or gases and long lining life are some of the outstanding advantages.

You can make partial melts, or substitute smaller furnaces to meet future requirements, or convert completely to heating at any time for a fraction of the original cost.

LABORATORY AND PILOT PLANTS. Most of our modern alloys were first melted in test samples of a few ounces. Pilot plant outfits melting 50 pounds frequently pave the way for large quantity production. Standard equipments range from simple 3 kw converters for one ounce melts to tube converters up to 60 kw and high frequency motor generators up to 1200 kw. Frequencies range from 1,000 to 1,000,000.

THE "KNOW HOW" OF HIGH FREQUENCY. The pioneer development of equipment for High Frequency melting and heating, and the subsequent application to hundreds of widely different jobs has produced a wealth of "know-how" which is not available from any other source.

If you want to know how you can speed up your war operations and at the same time provide for quick peace time conversion, get in touch with us.

AJ55

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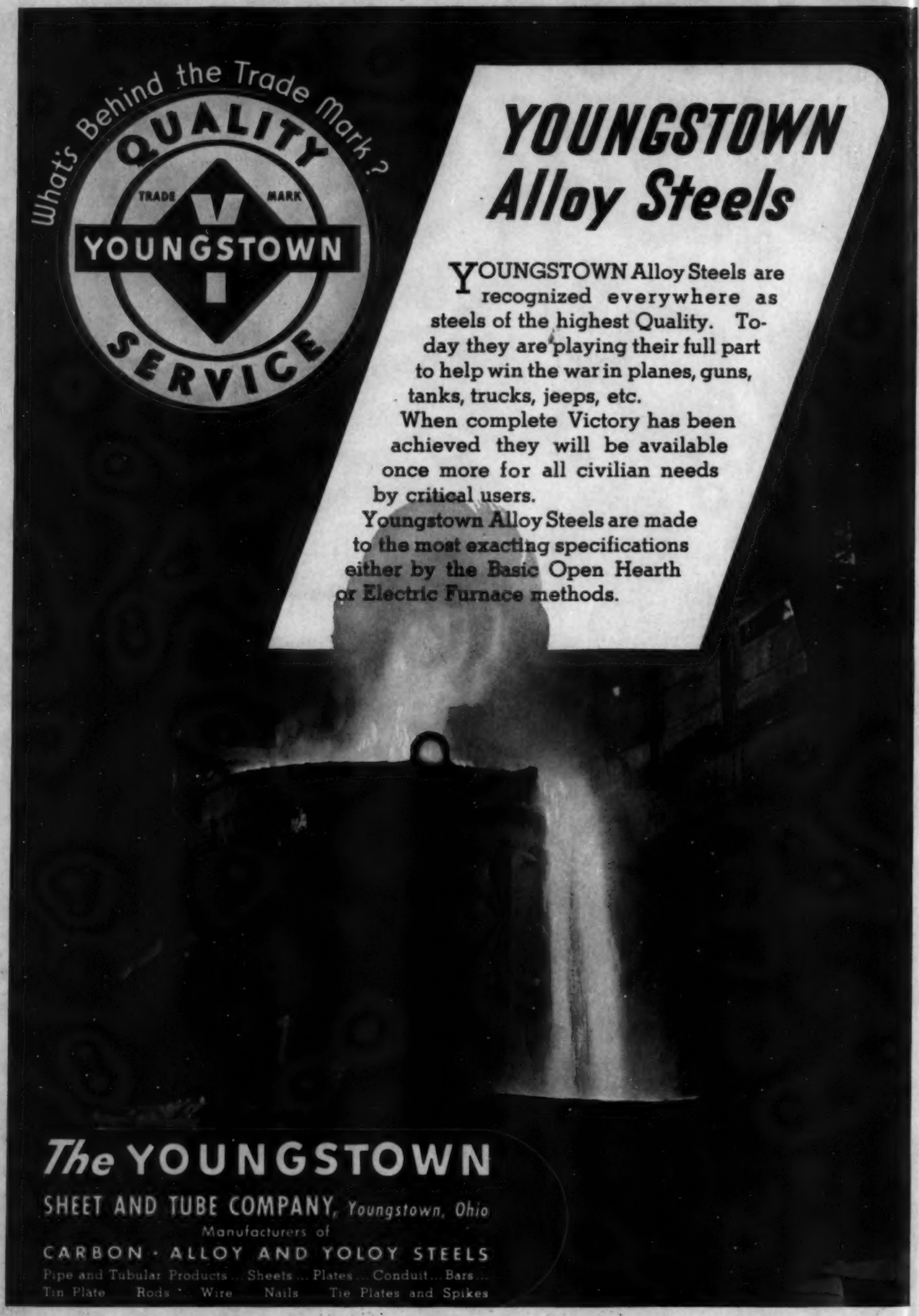
AJAX ENGINEERING CORPORATION. *Aluminum Melting Furnaces.*


What's Behind the Trade Mark?
QUALITY
TRADE MARK
YOUNGSTOWN
SERVICE
YOUNGSTOWN
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YOUNGSTOWN Alloy Steels are recognized everywhere as steels of the highest Quality. Today they are playing their full part to help win the war in planes, guns, tanks, trucks, jeeps, etc.
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Tin Plate ... Rods ... Wire ... Nails ... Tie Plates and Spikes

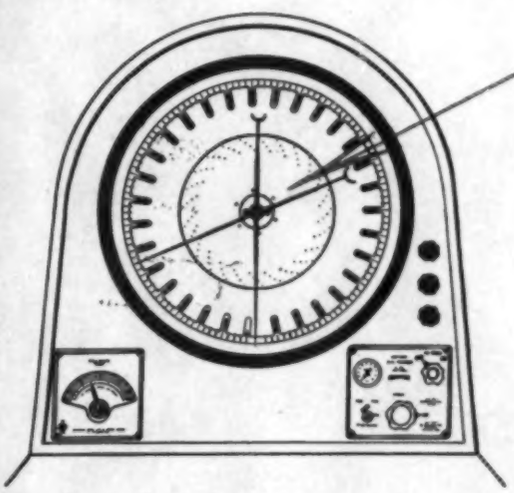
Number 2 of a series covering use and maintenance of Southwark Testing Machines

War Service **Memo:** *To users of Southwark testing machines*

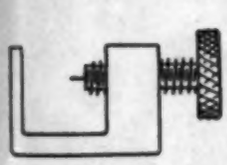
the proper positioning of

Indicating Hands

The extremely sensitive and accurate Southwark-Tate-Emery Indicator operates as a mechanical potentiometer using air for power. When the air pressure is off and the indicator at rest, the black hand should point directly downward. If because of shock or any other reason it does not, it should be removed and corrected.



Use the hand jack (illustrated), furnished with the machine, to remove it. In replacing it in the proper position (over the letter "T" in the space between the ends of the scale) the hand should be firmly driven on the tapered shaft using a short squared end tube which is tapped sharply with a light wrench.

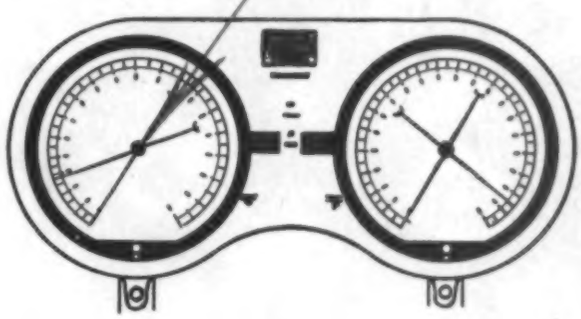


If this simple precaution is taken, there should never be any difficulty in setting to "O" by means of the normal adjustments.

It is extremely rare that the red maximum hand requires adjustment. If it should become necessary, however, the hand should be disassembled and the spring washer bent very slightly as required.

Hundreds of Southwark machines with bourdon tube gages are still in service. With normal no-load conditions, the black indicating hand and the rotatable dial of these bourdon tube gages should be in about the position shown. If not, it should be positioned properly following the same procedure in removing and replacing hand as described above.

The red "max" hand of these bourdon tube gages has no friction washer. The proper friction is produced by the



lubricant used on the shaft. Vaseline at the center of the shaft is used for maximum friction, a mixture of vaseline and oil for less. In reassembly be careful to tighten the nut which holds the shaft only slightly to avoid binding the hand. The least friction which will prevent coasting is desired.

BLW THE BALDWIN GROUP

BALDWIN SOUTHWARK

Division **THE BALDWIN LOCOMOTIVE WORKS,** *Philadelphia, Pa.*

IMPRESSIVE NEW FIGURES

War production has given us some entirely new classifications of figures to deal with.

First, industry is dealing with greater sums of money than ever before—greater quantities, greater numbers of items.

Second, we in industry have learned a lot about new standards of precision—"toolroom" accuracy introduced into mass production—tolerances measured in "tenths" instead of mere thousandths.

Acme-Gridley Multiple Spindle Automatics are among the very few machines that have the capacity to produce immense numbers of identical metal parts at high speed, without sacrifice of the required high precision standards.

The twofold ability of Acme-Gridleys—precision and speed—results in the lower costs essential to competitive manufacturing and selling in post-war markets.

The NATIONAL ACME *Company*

CLEVELAND · OHIO

ACME-GRIDLEY AUTOMATICS
maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

IS CHROMIUM PLATING YOUR ANSWER TO EXTENDING THE LIFE OF VALUABLE TOOLS AND EQUIPMENT?

SALVAGE for example...

CHROMIUM PLATING may reclaim many parts when worn or machined off-size

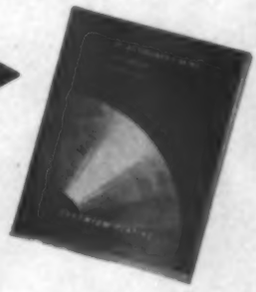
THE PROBLEM of replacing parts of worn equipment and production tools is frequently solved by building up the worn areas with chromium. Many plants also use chromium plating to reclaim parts which have been machined off-size and would otherwise have to be scrapped. Time and material saved in this way are especially important to the war effort. In addition, the reclaimed part often lasts several times longer than the original piece due to the hardness and wear resistance of the chromium plated surface.

For example, one plant salvaged several hundred cut and draw punches with off-center punch bearings by grinding them oversize and then chromium plating. Another had just completed an order for 700 spindles when the specifications were changed. Too small by several thousandths, they were salvaged by building up with chromium. Steel shafts on pumps handling corrosive liquids had to be replaced every few months . . . Reclaimed by chromium plating, they have shown no sign of wear in three years!

FOR MANY OTHER PARTS AND TOOLS

These are just a few of countless ways that chromium plating saves valuable materials and man-hours today . . . by extending the life of a wide variety of surfaces subject to wear and corrosion. Successful applications for both new equipment and salvage include:—coating and drying rollers, molding and mixing equipment, ball and roller bearing parts, cylinders, cylinder liners and piston rings, shafts, axles, pistons and many types of taps, dies, reamers, spindles, fixtures and gauges.

Booklet describes these applications in detail ➡



"The Last Thousandth of an Inch" will assist in determining the application for chromium plating on your products and equipment. In writing for your copy, please mention Steel.

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INCORPORATED

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Waterbury, Conn. ☆ **Detroit, Mich.**

Meeting your most particular demands for heat-treating cold headed products

CLEVELAND uses modern electric furnaces for controlled hardening . . . to assure uniform strength

● The strong trend to heat treated cap screws and other cold headed products in recent years has called for ever-increasing capacity in this department of our plant. The electric furnace equipment is the most modern obtainable—running continuously, and accurately controlled to give uniform hardness and toughness. Stronger fastenings and parts thus become available for tanks, planes, and other war equipment where the extra margin of safety provided in heat treated high carbon and alloy steels is of vital importance.

THE CLEVELAND CAP SCREW COMPANY
2917 E. 79th St., Cleveland, Ohio

◀ Electric hardening furnaces that maintain uniform quenching temperatures. Controlled atmosphere prevents scale and decarburization.

●

◀ Electric Homo-tempering furnaces where accurate temperatures complete the heat treatment cycle by correct drawing.

Cleveland Cap Screws

Set Screws and Special Upset Parts

Made by the Originators of the Kaufman Process for Greater Strength and Accuracy

Specialists for 26 years in Headed and Threaded Products

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First You need not be seriously handicapped by the restrictions on 18-4-1 for Hack Saw Blades, due to the shortage of vital alloys. The timely development of D-B-L Steel gives you lower cost blades with tough cutting edges, high impact resistance, and relative freedom from decarburization.

Second Only Ingersoll Steel Mills have had 4 years' experience in producing sheets of D-B-L Steel exclusively for Hack Saw Blades.

Blades made of Ingersoll D-B-L Steel are available from leading makers of Hack Saw Blades. Be doubly sure of satisfaction by specifying—"Made of Ingersoll D-B-L Steel"—on orders for Hack Saw Blades.

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(Tungsten 5.00-6.00
Molybdenum . . 4.00-5.00)

The remarkable performance of Ingersoll D-B-L . . . its relative freedom from decarburization . . . its tough cutting quality and its high impact resistance . . . plus its lower cost, have made it a wartime favorite.

INGERSOLL SPECIAL STEELS FOR SPECIAL USES

Alloy Steels
Armor Plate
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Shovel Steels
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TEM-CROSS Steel
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Stainless Steels and Saw Steels, including "18-4-1" and Molybdenum and D-B-L Hack Saw Steels.

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BORG-WARNER CORPORATION

NEW CASTLE, INDIANA

Plants: New Castle, Indiana; Chicago, Illinois; Kalamazoo, Michigan

INGERSOLL D-B-L HACK SAW STEEL

★ *from furnace to pouring*

VIA

CHICAGO TRAMRAIL

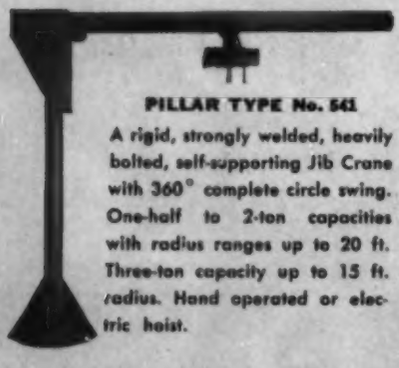
MONORAIL CRANES

Faster . . . Safer . . .

Photos courtesy Atlantic Brass Works—Chicago

★ View at top shows man pulling a crucible of molten brass, which will soon be whisked from the furnace to the floor by a small-size Chicago Tramrail Furnace Crane. The skimming operation done, the load is then switched to the larger overlapping Monorail Crane (bottom view) which spans all molding points for rapid distribution of the liquid metal. All flasks can be poured direct from this crane.

A low-cost installation of this type is but one of many hundreds that have been designed and "built-in" by Chicago Tramrail engineers for speedier and safer overall foundry operation.



PILLAR TYPE No. 541

A rigid, strongly welded, heavily bolted, self-supporting Jib Crane with 360° complete circle swing. One-half to 2-ton capacities with radius ranges up to 20 ft. Three-ton capacity up to 15 ft. radius. Hand operated or electric hoist.

Use JIB CRANES at points-of-operation . . .

You will be agreeably surprised at the flexibility and speed of Jib Cranes. They release heavy-duty overhead cranes for other work. Order a trial installation today. Be sure to state lifting capacity, length of arm and distance from floor to arm. Get illustrated circular. Write

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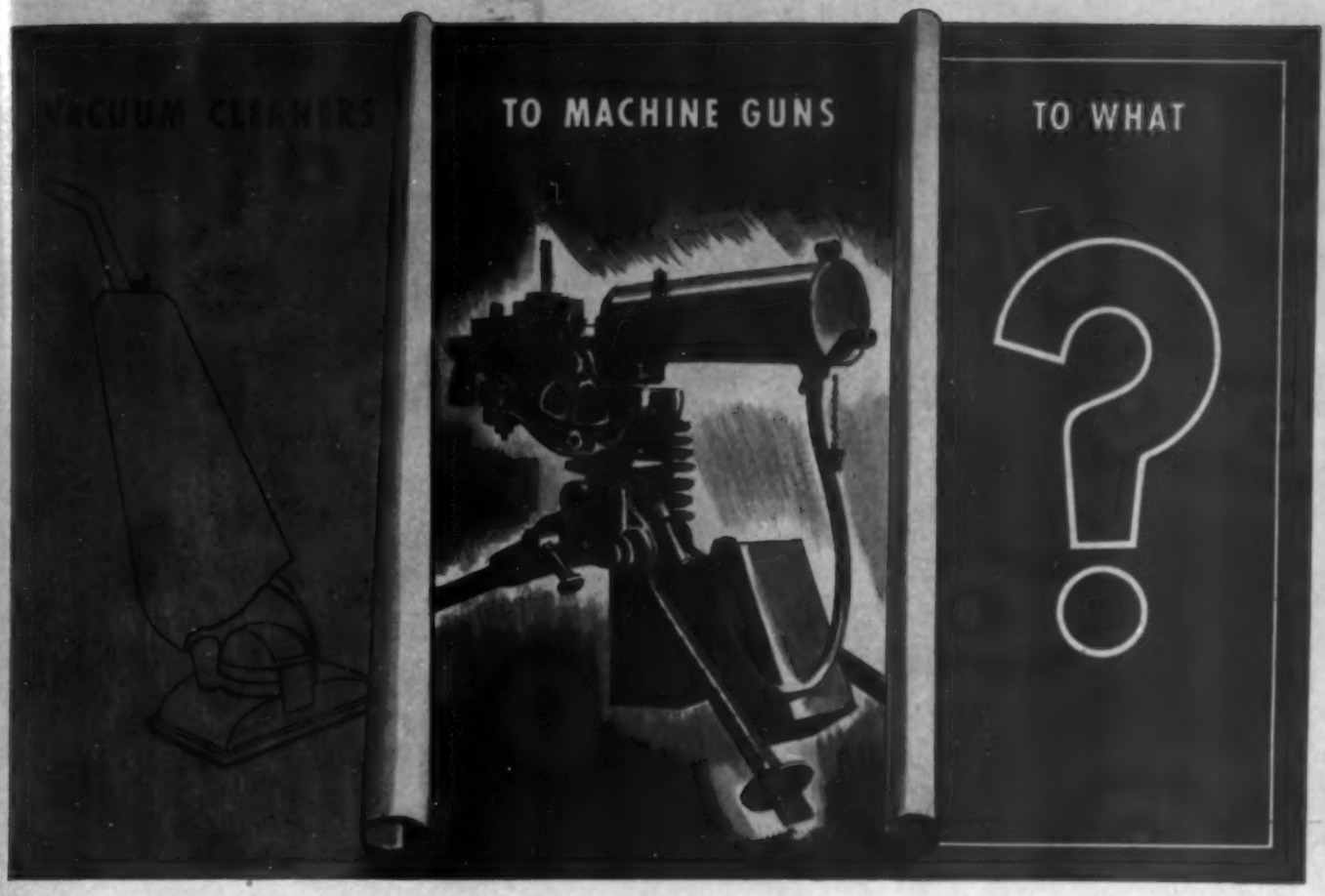

PLAN YOUR DISTRIBUTION SYSTEM

FOR *Quick Production Shifts*

Future demands on your plant are being decided on battlefields thousands of miles away. To meet them, utmost flexibility in production facilities is the order of the day.

Such flexibility depends to a large extent on your plant distribution system. Is it adaptable to quick changes in the nature, density and location of loads?

Westinghouse engineers have helped hundreds of war plants choose the "one best" distribution system for their needs. In each case, increased efficiency and protection against sabotage, with the least use of critical materials—have been the governing factors in the selection.

This broad engineering experience is available to you, to help you better meet today's demands, and get set for the swift changes that may come tomorrow.

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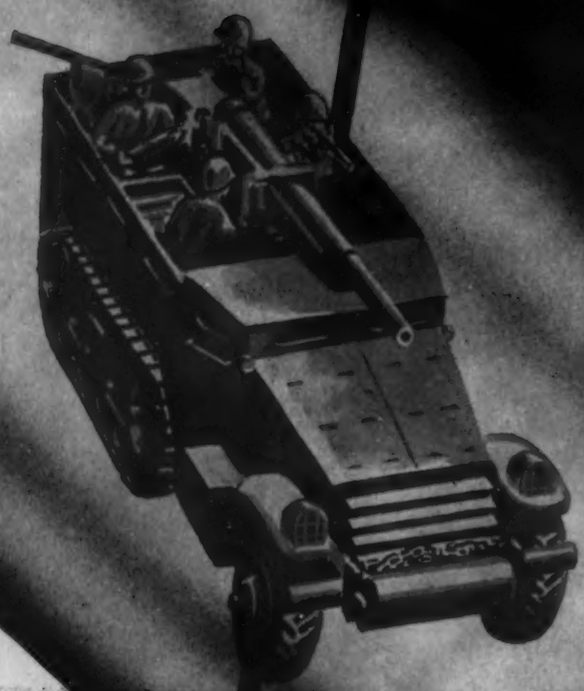
Keep up to date on latest plant distribution systems. Send for 24-page Booklet, B-3152, which briefly describes different plant distribution systems, and points out the advantages of each.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

PLANT DISTRIBUTION SYSTEMS

BETTER FINISH INCREASED TONNAGE



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DIVISION OF BLAW-KNOX CO.
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Also manufacturers of
ROLLING MILL MACHINERY
for the iron, steel and non-ferrous industries

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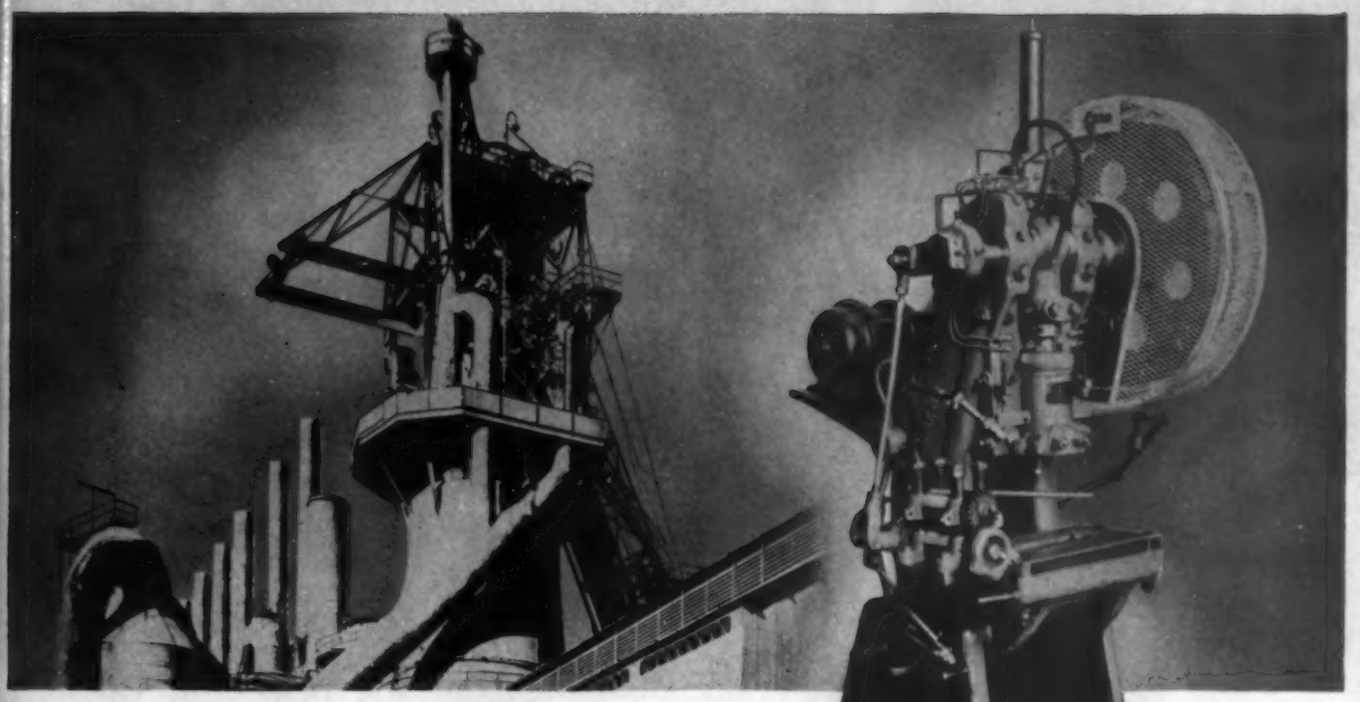

FROM BLAST FURNACE TOPS

TO PUNCH PRESSES.....

TRABON LUBRICATING SYSTEMS

Meet EVERY Industrial Lubricating Requirement

● On blast furnace tops, overhead traveling cranes, costly steel mill equipment, forging presses, brakes, shears, machine tools and other lighter duty machinery,— install Trabon Lubricating Systems.

Trabon Lubrication makes absolutely certain that every connected bearing, whether large or small, receives just the desired amount of lubricant, *while the machine is in operation.* Trabon avoids the costly down-time while an oiler crawls over the machine to lubricate each bearing individually,— and the break-down if he misses one. Trabon prolongs bearing life, minimizes machine tie-ups—reduces accidents and compensation costs.

Thoroughly dependable, and less costly operation, are only two advantages of Trabon Lubrication. The use of fully enclosed "feeders" that have no exposed moving parts to corrode or get bent,—easy installation,—and the ability to place the feeders in the most advantageous position available, whether high overhead or under the floor, are some of the others. You'll find full details in our recently issued, fully descriptive Engineering Bulletins. Send for copies today.

TRABON

ENGINEERING CORPORATION

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STEP TURNING...

3 times as fast!

MONARCH PERFORMANCE REPORT

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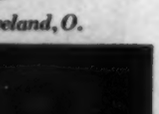
Part Name Shaft
Material S.A.E. 1045
Heat Treat None
Operation Turn for grinding- Leave .020 Grind Stock
R. P. M. 420
Surf. Speed 275
Feed .015
Max. Depth of Cut 1/4"
Type Cutting Tool Carbide tipped

Actual Cutting Time 3.21 Min.
Load Time 4.46 Min.
Approx. Tool Life 55 Min.
Memorandum Foreman reports production 3 times as fast as on manually controlled lathes.

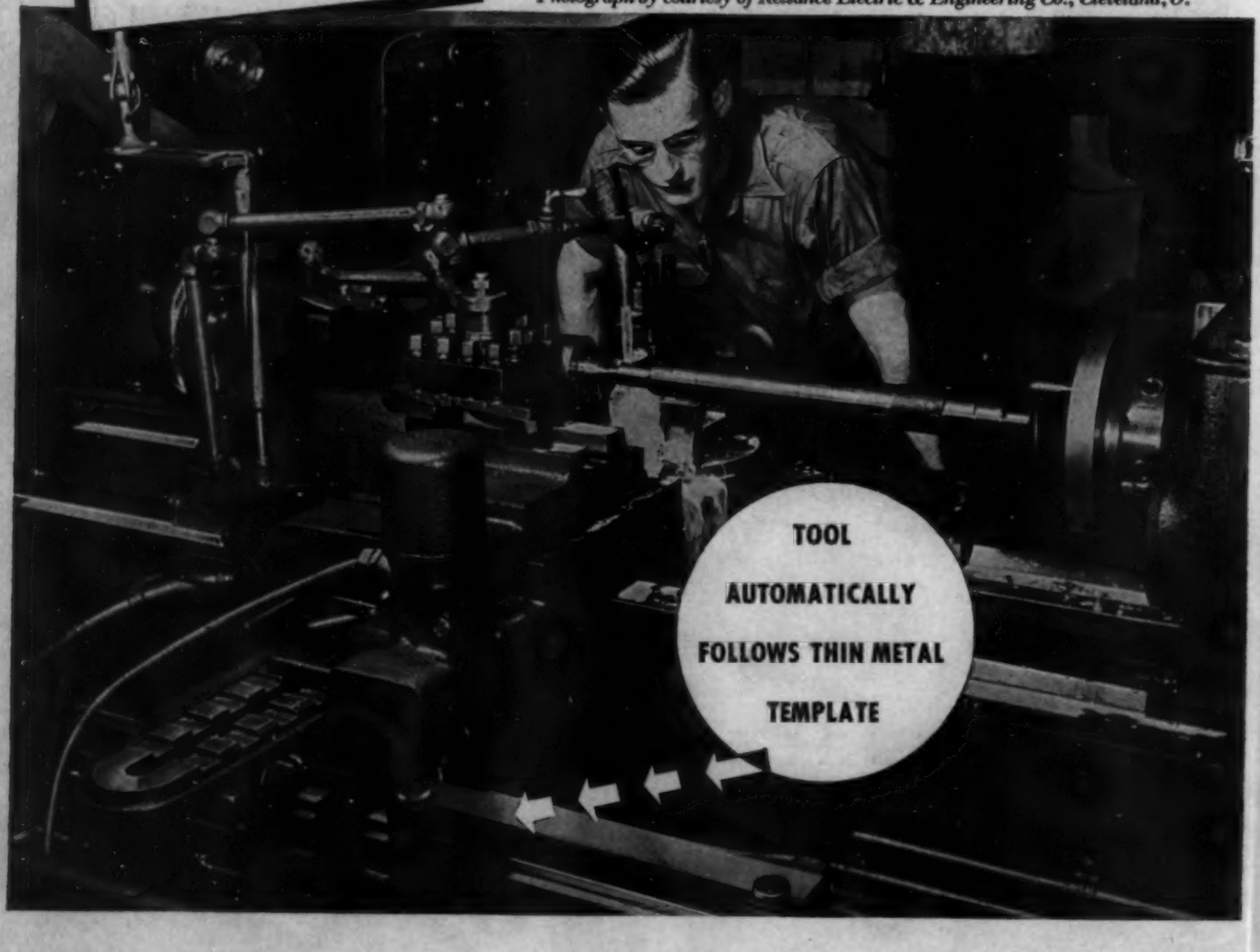
Turning the job illustrated is accomplished three times as fast on Monarch lathes equipped with automatic sizing, as was formerly done on standard lathes with manual control. It is typical of what can be accomplished on such work as turning, boring or facing or combinations of these operations. If you are interested in the application of Monarch's automatic sizing, to work in your plant, our engineers will gladly work with you.

THE MONARCH MACHINE TOOL COMPANY · SIDNEY · OHIO

MONARCH LATHES Save Time



Photograph by courtesy of Reliance Electric & Engineering Co., Cleveland, O.



Heavy drain on high-grade iron ore resources speeds research activity. Page 73

STEEL

The Magazine of Metalworking and Metalproducing

JULY 19, 1943

Volume 113 *Number 3*

NEWS

Iron Ore	73	WPB — OPA	87
Present, Past and Pending	75	Men of Industry	96
Steel Drive	76	Obituaries	97
War Production	78	Postwar Planning	98
Steelworks Operations	79	Engineering Ingenuity	100
Steel Control	80	Meetings	102
Tin Plate	81	New Facilities	103
Congress	84	Activities	104
Priorities	86	Army-Navy Awards	105

TECHNICAL

Planned Motor Drives Save Steel and Copper ... 108
Features of the Adjustable-Speed Drive

Making 90-MM Guns Depends Upon Correct Tooling ... 110
How Wheland Co. "Licked" Its Production Problems

Alloy-Sprayer Coats New Work ... 116
Its Use Also in "Regalvanizing" Old Materials and Patching Weld-Burned Areas

Spot Welding Aluminum ... 118
Details of Cleaning Methods; Metallurgical Factors

Materials Handling Principles Every Plant Manager Should Know ... 122
How to Handle Materials Without Actually "Handling" Them

Electrolytic Tinning Lines Help Solve Tin Shortage ... 126
Saves Two-Thirds of Tin Normally Required for Plating

Properties of Rubber as Used in Metal Drawing and Pressing Dies ... 130
Its Use and Place in "Tooling"

FEATURES

Behind the Scenes with Steel	4	Wing Tips	92
As the Editor Views the News	69	The Business Trend	106
Windows of Washington	82	Industrial Equipment	134
Mirrors of Motordom	89	Construction and Enterprise	168

MARKETS

Hope for More Civilian Steel This Year Fades ... 149
Market Prices and Composites ... 150

Index to Advertisers ... 177
Where-to-Buy Products Index carried quarterly

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but a $1.10 order got it into the air

Billion-dollar orders for aircraft get the headlines, but more than once, a *dollar* order to Graybar for a missing part has been a key factor in getting a plane fully ready for flight.

One important builder, for example, rushed five emergency orders for production items to Graybar in a single day. Their amounts? $1.10, $15.00, $5.00, $1.10 and $1.10. One covered an all-important set of special fuses. Others were for cable rings, clips, fittings and special lamps.

In one case, a special messenger made immediate delivery from stock. In others, telephone calls to St. Louis and Cleveland helped speed delivery. All were "money-out-of-pocket" orders for Graybar, from the short-range point of view.

In building today's complex combat equipment, emergency needs like these are inevitable, no matter how carefully buying is planned. That's why prime contractors whose orders run to billions maintain a close tie with a local Graybar office, with daily or even hourly contact.

From its nationwide network of warehouses, from its well-informed relations with more than 200 leading suppliers, Graybar serves as Procurement Advisor on electrical needs, large and small. Why not check up now to see if your company is using Graybar's time-saving services to the full?

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IN OVER 80 PRINCIPAL CITIES

GraybaR Everything Electrical . . . THAT IT TAKES TO WIN!

AS THE EDITOR VIEWS THE NEWS

STEEL
July 19, 1943

SABOTAGE FROM WITHIN: Last Wednesday Donald M. Nelson, chairman of WPB, warned that production of munitions in May was "unsatisfactory" and that of June, "although better than that in May," was short of its goal by half a billion dollars. He attributed this showing to shortage of industrial manpower, absenteeism, strikes and "a false and dangerously premature feeling that the war is in the bag."

Most informed persons will agree readily that these factors, in varying degrees, are affecting war production. We could be doing a better job than is being done if these obstacles were eliminated. But it will be difficult to eliminate them, or even to reduce their harmful influence, unless the public takes a more positive stand against the conditions responsible for these retarding factors. Apparently Mr. Nelson recognizes this fact, because he said that the government needs help in "making the civilian population understand the need of intensifying the war effort."

The government does need and should receive all the help that can be given it. However, the most urgent need of all is an administration in Washington of the nation's internal economy that will merit the respect of the people. If the American public does not understand the necessity of intensifying the war effort and if it is too complacent about hindrances to production, it is largely because so many high-placed individuals and so many agencies in Washington seem to be dilly-dallying with the war program.

Consider the Wallace-Jones feud, the Chester Davis and Lou Maxon resignations and the elevation of men like Vinson, Brown and Marvin Jones to positions which should be held by men with administrative instead of political experience. These are but outward evidence of the constant war being waged against the hard-working "know how" men in Washington by the visionary, inept and thoroughly meddlesome theorists who, through the offices of the "quiz-kid" invisible cabinet, seem to increase the security of their jobs in direct ratio to the number of blunders they make.

The real menace to the war program is not the lack of proper spirit on the part of the American public. Instead, it is the demoralization within the government agencies dealing with civilian economy, which demoralization breeds public disrespect and apathy.

The greatest service citizens can render to Donald Nelson and the hundreds of other "know how" officials is to press hard for the elimination of the thousands of inept meddlers and to insist that the scores of non-war agencies help the war effort instead of sabotaging it.

Your senators and congressmen will be home until after Labor day. Tell them in detail just what you think of the disintegration of the administration of internal affairs.

• • •

NEED MORE EMPLOYERS: Writing in one of a series of pamphlets entitled "Postwar Readjustments" (p. 98), Dr. Emerson P. Schmidt propounds some thought-arresting questions regarding wages and employment relations. For instance, he raises the question as to whether labor has not "overpriced itself in terms of full employment."

Also he questions our national technique on unemployment. In the thirties, he says, we tried to correct unemployment by making the position of the employe more attractive and that of the employer less attractive. "Then we wonder why there are not more employment opportunities! We need more employers. The way to get them is to make their birth and survival rate higher."

Well put, we would say.

• • •

PIG IRON FROM TEXAS: Before Congress adjourned Senator Pat McCarran of Nevada wrote to 33 other senators inviting them to participate in a coalition or bloc to foster new and expanded iron and steel plants in states where such facilities do not exist or are not extensive.

Whether or not the senator's proposal can be taken seriously, it is a fact that the exigencies of war already have caused an appreciable "decentralization" of iron and steel facilities. Furnaces and mills

(OVER)

are being erected in localities far from established iron and steel centers.

Typical is Texas. Not only is the Lone Star state gaining in steelworks and rolling mill facilities, but the two blast furnaces now building (p. 103), when completed, will restore Texas to the roster of pig iron producing states after a lapse of many years.

• • •

WANTED—A CRAZY IDEA: In recent years the rich iron ores of the Lake Superior region have been consumed much more rapidly than ever before. Sooner or later it will be necessary to rely more heavily upon leaner ores. The sooner this is done, the better for all concerned.

All iron ore and iron and steel men know this. Several interested companies have been conducting extensive research to find economical means of utilizing the leaner ores. These investigations hold forth varying designs of promise for success, but the principal companies and individuals concerned want to be doubly sure that they find the right answers promptly. Therefore they are augmenting their individual efforts (p. 73) with a co-operative research program. Removing silica from iron oxide economically will be one of its principal objectives.

Also—believe it or not—these practical-minded men are openly seeking a "crazy idea"—possibly from a layman or somebody not too well versed in minerals—which may lead to the correct solution.

Some readers will smile at this frank appeal for help from unorthodox sources, but we believe the ore men are on the right track. Certainly history supports their method. Many of our most notable inventions and discoveries have resulted from somebody's faith in a "crazy idea."

• • •

P.S.—For timely evidence as to how a "crazy idea" is making good in the war effort, note the practical manner in which a freak bridge (p. 100) is solving a unique problem of an upper Yorkstate builder of oil tankers for the U. S. Army.

• • •

ELECTROLYTIC TIN PLATE: Japan's capture of our principal sources of tin has hastened the development of electrolytic tin plating in the United States. Today 26 electrolytic tin plate lines are completed or under construction in the mills of 11 companies.

These new units are significant for two reasons. First, they will conserve precious tin (p. 81) during the war. In the hot-dip process a minimum coating of 1.25 pound of tin is common practice. Electrolytic tin plate with a 0.5-pound coating, while not acceptable for all tin plate applications, is satisfactory for most fundamental requirements during the emergency. For uses where the 0.5-pound electrolytic plate can be substituted for the hot-dipped product (p. 126), a saving of 66 per cent in tin consumption is expected. This is conservation with a capital "C."

The second significant point is that these electrolytic lines constitute a second major change in tin plate practice in a short time. Only a few years ago cold-rolled tin plate came into vogue almost overnight. Now a sudden upsurge in electrolytically coated plate is sweeping the industry. What will this mean when tin is more plentiful and when normal market conditions are resumed?

• • •

BAGGING SAVES MONEY: When a riveter in an airplane factory goes to the storeroom for an allotment of rivets, does it make any difference how the rivets are delivered to him or her?

Fleetwings' officials have discovered that it makes a lot of difference. They now issue rivets in small cellophane bags (p. 92) and find that the practice shows a saving in dollars of four to one on heat-treated rivets and of 10 to 1 on non-heat-treated rivets over unbagged rivets.

• • •

MORE STEEL IN SIGHT: WPB's "Steel for Victory" drive reports modest progress. Further cancellation of steel orders—mostly in the third quarter—brings to 150,000 tons (p. 76) the savings effected to date by the "Share the Steel" portion of the campaign.

Encouragement also is derived from an easing of the coal crisis. All but a few stacks are scheduled to resume operation, but only after an acute loss of production and a punishing cut in steel's laboriously accumulated stocks of scrap.

From now on the success of the effort to eke out 2,000,000 more tons of steel during the second half will depend largely upon the absence of man-made interruptions and bad luck. It is a touch-and-go proposition.

E. L. Shaner

EDITOR-IN-CHIEF

Machine Output UP 37% TO 110% with INLAND LEDLOY

LEDLOY is the lead-bearing, faster-machining steel that produces more parts per hour, lowers labor and machine costs, and increases tool life up to 300%.

Inland Ledloy is open hearth steel containing a small percentage of lead added by a special Inland process. This addition of lead results in slight refinement of grain structure and greatly increased machinability. In all other physical properties—yield strength, ultimate strength, elongation, reduction of area, etc.—Inland Ledloy is the same as open hearth steel of similar analysis.

Today, Inland's entire production is being used by war industries to help win the fight for freedom, but when peace comes Ledloy will again be available for general manufacturing use.

Write for further information on Inland Ledloy

"Foreign Agent"—LEDLOY LIMITED
66 Cannon Street, LONDON

Reports on five Inland Ledloy case studies recently made in British munition plants:

No. 1—Bottom Bracket Cycle Spindle

	Free Cutting Steel	Inland Ledloy
Spindle speed	500 r.p.m.	700 r.p.m.
Time per piece	59 sec.	28 sec.
Tool steel	18% tungsten	18% tungsten
Increased production	—	110%

No. 2—Grease Nipple

	Free Cutting Steel	Inland Ledloy
Spindle speed	2,495 r.p.m.	4,140 r.p.m.
Time per piece	20 sec.	13 sec.
Increased production	—	53%
Increased tool life	—	300%

No. 3—Set Screw

	Screw Stock	Inland Ledloy
Spindle speed	490 r.p.m.	693 r.p.m.
Time per piece	95 sec.	69 sec.
Increased production	—	37.6%

No. 4—5/16" x 2" Bolt

	Screw Stock	Inland Ledloy
Spindle speed, turning	896 r.p.m.	1,126 r.p.m.
Spindle speed, threading	296 r.p.m.	373 r.p.m.
Time per piece	21 sec.	13 sec.
Increased production	—	62%
Increased tool life	—	300%

No. 5—Locknut Blanks

	Free Cutting Steel	Inland Ledloy
Spindle speed	2,140 r.p.m.	2,140 r.p.m.
Time per piece	18 sec.	10 sec.
Increased production	—	44%
Increased tool life	—	50%
Spindle speed, tapping	950 r.p.m.	2,200 r.p.m.
Increased life of tapping tool	—	200%

INLAND STEEL CO.

38 S. Dearborn Street, Chicago

Sales Offices: Milwaukee • Detroit • St. Paul • St. Louis • Kansas City • Cincinnati • New York

"Share the Steel" Campaign Launched by W.P.B.

Will Try for Reduction of Inventories and Elimination of Duplicate Stocks

The cooperation of all manufacturers using steel is being sought by the WPB, to cut inventories and gain 2,000,000 tons of steel. Working through its 12 Regional Offices, Steel Division officials have been sent by the Washington Office to work with consumers, in an effort to see if steel supplies on hand will permit the elimination or deferment of third and fourth quarter orders on producers books without interfering with the production of important war equipment.

This effort to "share the steel", if successful, will permit the diversion of tonnage to other manufacturers of war products who need it.

If each manufacturer will check his inventories against requirements carefully and avoid duplicate stocks, this government program may accomplish its purpose and make available the extra two million tons of steel needed during the last six months of the year.

Stocks of steel in the hands of commercial warehouses strategically located to serve *all* manufacturers help to overcome the necessity for large individual inventories and many duplicate stocks.

These steel service plants with long experience in stocking, cutting and shipping steel on a moment's notice—are definitely the answer to the problem. Throughout the history of America, in peace and in war, they have served this very purpose. And now, in this greatest national emergency, they are carrying the burden—and stand ready to do even more to make it safe and practical to reduce high inventories, eliminate duplicate stocks, and lower the overall tonnage of idle steel.

JOSEPH T. RYERSON & SON INC.

STEEL-SERVICE PLANTS AT: CHICAGO, MILWAUKEE, ST. LOUIS, CINCINNATI, DETROIT, CLEVELAND, BUFFALO, BOSTON, PHILADELPHIA, JERSEY CITY.

WANTED: An Idea

Operators of Lake Superior mines, in conjunction with Battelle Memorial Institute, launch research program to develop means for utilizing low-grade hematite as high-grade ore reserves shrink under tremendous consumption

THE LAKE SUPERIOR iron ore industry wants an idea.

It may be an idea such as sometimes springs spontaneously from the mind of a layman who knows little about the difficulties presented by the problem to be solved. In the past, some of the most baffling mechanical problems have been solved in just that way.

It may be worked out by some student of chemistry or physics working by himself in a make-shift laboratory.

Again, it may be evolved only after years of patient research by men who know about all there is to be known at present concerning characteristics of iron ore. Some of them have been engaged in research on the task many years, but so far —and it is a fact admitted by themselves—they have not produced the idea that is wanted. This is a practical, low-cost method for separating silica from iron oxide, in the great reserves of low-grade hematite in the Lake Superior district.

It is this that leads some of the mine operators to believe a solution may come some day through "a crazy idea" originating in the mind of an individual who has not been blinded by too close and too long a scrutiny of the formidable technicalities of the task.

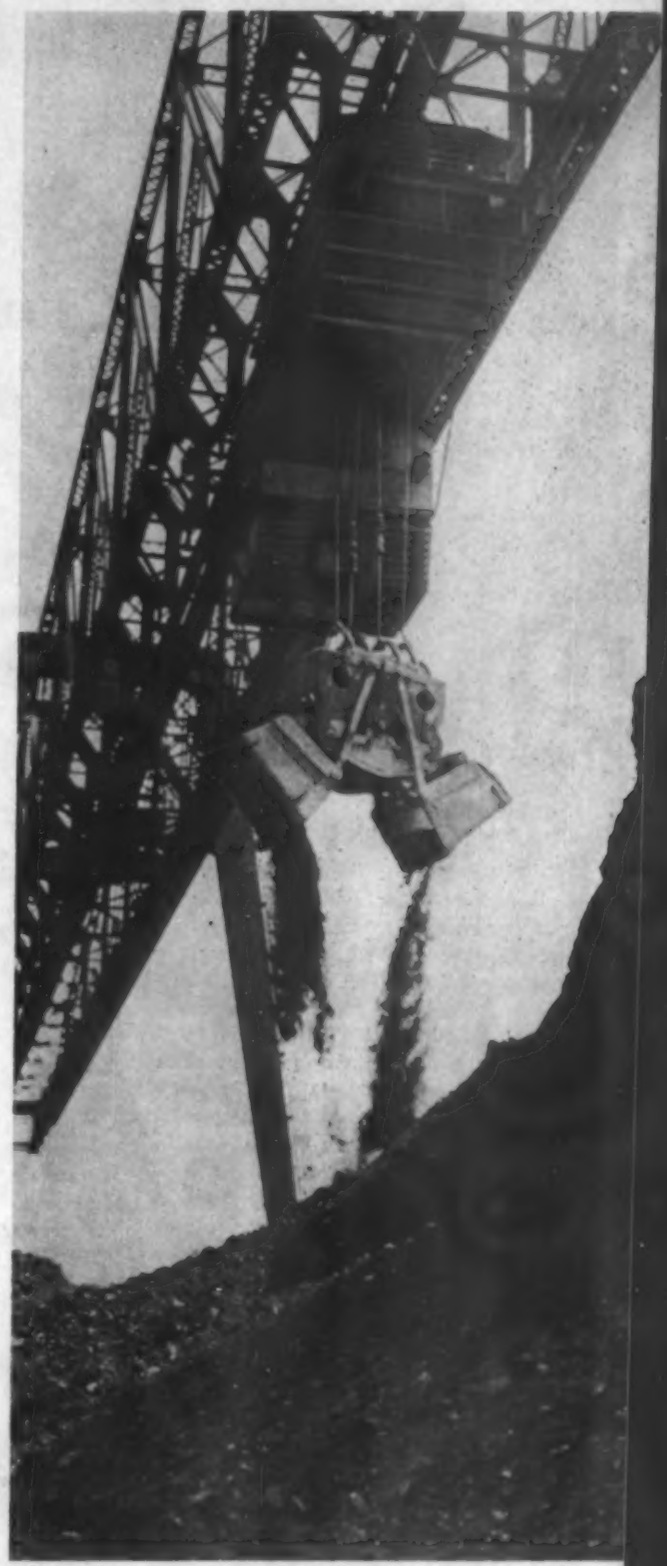
One experimenter highly regarded in the industry states frankly he is "no further ahead" on this particular problem than when he began work on it 20 years ago, which is an understatement considering the brilliant work he has done in related problems.

Recognizing its vital importance and determined to do something about it now, representatives of steel and ore companies met in Cleveland recently and decided on a research program, to be sponsored by them and the Battelle Memorial Institute, and to be undertaken by the institute at its laboratories in Columbus, O. An expenditure of $50,000 annually is contemplated and this sum has been assured by the participating companies and the institute, for the first year.

The group elected as chairman R. C. Allen, president, Lake Superior Iron Ore Association, and executive vice president, Oglebay, Norton & Co., Cleveland.

Stated broadly, the purpose is to develop means for utilizing the low-grade hematite ore in the Lake Superior district, without which the steel industry will begin to feel the pinch of diminished reserves within ten years. The "nubbin" of the job is to be able to separate quickly and cheaply, under ordinary commercial conditions, silica from iron oxide.

A large proportion of the ore is in the form of hard rock, containing a low percentage of iron. The rock may be pulverized as a preliminary to concentration—no difficulty about that. Other elements besides silica may be controlled by means now well known—no great obstacle in that. But the



Crane removing ore from vessel to lakefront docks at Cleveland. Ore is transferred at this point to cars and shipped to the hungry blast furnaces. . . . Stocks on hand at lake ports are under year ago

Late opening of navigation and adverse weather have served to retard movement of ore on Great Lakes in season to date. . . . Shipments 9,000,000 tons behind movement in like period of last year. . . . Scene above shows ore being unloaded from vessel at lower lake port

besetting impurity is silica—or sand—so intimately associated with the oxide that it defies separation.

Certain classes of ore lend themselves to crushing, screening and washing, to get rid of excess silica, but they are relatively high in iron to begin with. Hematite has even been converted to magnetite and the magnetite then separated from silica by magnets, and this has been done on a limited commercial scale for years. But the process is "round-about," and the industry as a whole is not concerned with a few hundred thousand tons of such concentrates, but over billions of tons of iron-bearing material that awaits the birth of an idea before it can be of service to mankind.

The reserves on which the industry mainly depends for the long-range future are composed of the low-grade hematites and magnetites. The problem of quarrying granite-like rock bearing magnetite, grinding it to a fine powder, separating the magnetic oxide from silica and sintering the oxide into a high-grade ore was solved mechanically nearly 20 years ago. A plant on the eastern tip of the Mesabi range, built by the Jackling interests and later taken over by a Cleveland ore company, will go into production again when required. Costs were too high and demand too restricted in the era the nation recently passed through to warrant its operation, but billions of tons of the material are there, and the means for recovering the iron are known.

Now with the steel industry built and geared to consume 100,000,000 tons of ore annually, producers are growing more concerned over future supplies and their costs. Even the United States Steel Corp. is participating in the $50,000 research program.

This, it must be stated, is in addition to carrying forward experimental work now being done by some of the large producers and consumers on their own account and that by the bureau of mines, as well as individual research by several large industrial companies related only indirectly to the steel industry. Totaled, the sum runs into hundreds of thousands of dollars annually.

The significance of this concerted action is this:

Authorities in the industry say that available reserves of high grade iron ore, usable as mined or readily converted to that purpose—will be gone in nine years at present rate of consumption.

The nation's industrial structure has been influenced by the location, quality and abundance of Lake Superior ores. Take away these supplies and great economic changes would result, affecting practically every manufacturing industry.

No one supposes that the present rate of consumption will be undiminished for the next ten consecutive years. Nevertheless, postwar plans, with the inevitable reconstruction and pentup civilian requirements, convince iron ore men that the industry has passed far beyond the prewar "normal" of 60,000,000 to 70,000,000 tons.

"All the postwar plans contemplate a high rate of employment, purchasing power and civilian consumption," said an iron ore producer. "These conditions must be attained if we wish to keep faith with all those who are now fighting for the nation, and if we want to preserve our form of government. We, in the ore industry are planning in the same spirit.

"We view this matter of what to do about iron ore as one of the greatest problems concerning the future of industrial America.

"The problem to which I have referred will be solved in time. It is too important to be neglected.

"So, while we are spending large sums in scientific research, the field is wide open. Our people today are thinking as they never thought before. Some 'crazy idea'—based on sound but obscure principle—may prove to be of inestimable benefit to the country.

"The more I have studied the problem and considered what has been done the more I have become convinced that we need a brand, new idea—something of the order that has revolutionized industries in the past. It may appear to be a 'crazy idea,' but 'crazy ideas' sometimes click."

Lake Ore Shippers Strain To Make Up Early Season Tonnage Deficit

IRON ore shipments are currently running slightly ahead of a year ago on a weekly basis, but the movement of 29,785,921 gross tons for the season through July 12 is almost 9,000,000 tons behind the 38,716,988 shipped in the corresponding 1942 period. However, the present increase in weekly shipments over a year ago is expected to steadily widen through the balance of this season.

With a break in the weather there is a good chance shipments this month may closely approach the record of 13,405,408 tons shipped in July last year, and shippers are confident a new monthly

shipment peak will be established in August.

Vessel interests, however, are seriously concerned over the possibility of an ore shortage next spring. They are doing everything in their power to increase the current movement to make up for the tonnage lost due to the late opening of the shipping season, delay in shipping schedules, and vessel collisions.

Based on an estimated consumption during June of 7,000,000 gross tons, stocks at lower lake ports and furnaces were about 22,700,000 tons as of July 1. On same date last year stocks totaled 26,728,185. With stocks about 4,000,000 tons below a year ago, and iron ore shipments just recently surpassing that of last year on a weekly basis, together with monthly ore consumption averaging well above a year ago and expected to become even greater as new blast furnaces are brought into service, iron ore stocks during early spring months next year may be short.

Offsetting factors include the present coal strike situation which has forced a number of blast furnaces down and the growing number of stacks being shut down for repairs.

New blast furnaces, depending principally on Lake Superior iron ore, scheduled to be brought into service through the remainder of this year are: Two at Braddock, Pa., for Carnegie-Illinois Steel Corp.; two at Chicago for Inland Steel Co.; one at Chicago and one at Cleveland for Republic Steel Corp.; and one at Monessen, Pa., for Pittsburgh Steel Co. There are additional new furnaces also scheduled to be blown in before the close of this year that are not dependent on Lake Superioir ores.

Shippers are hopeful that the goal of 91,000,000 tons set for this year will be reached. If fog conditions do not further delay shipping schedules over the remainder of the summer months, and storms and ore freezing weather are not encountered during the latter part of the shipping season, there is a fair chance that the goal will be attained.

Swollen lake waters—at highest levels in past 20 years—have permitted capacity loadings of most vessels. This has resulted in a series of cargo records recently established by the Pittsburgh Steamship Co.'s new vessels. The record is now held by the IRVING S. OLDS, with a cargo of 18,161 tons.

Another factor which ore shippers are depending on to make up the present deficit of 9,000,000 tons is the bringing into service of the 16 new Maritime Commission vessels. Five of the vessels are now in the ore trade; four are scheduled for July and the remainder through the balance of the season.

Opening of the Gen. Douglas MacArthur deep-water lock at Sault Ste. Marie on July 11 is expected to materially alleviate congestion of vessel traffic through the Soo canal during periods of adverse weather. When the lakes are not swollen to the present record levels, this new lock will permit passage of the 16 Maritime and five new Pittsburgh Steamship Co.'s vessels with capacity cargoes. The other three locks at the Soo could not handle these same vessels loaded to capacity under similar conditions.

Improved operating equipment in the new MacArthur lock also lessens the time interval in transit through the Soo. The new lock, 800 feet long and 30 feet deep, was built in record time of 13 months at a cost of $14,000,000. It compares with the Davis and Sabin locks which are 1350 feet long and 24½ feet deep; and the Poe lock, 800 feet long and 18 feet deep.

The self-unloader freighter CARL D. BRADLEY, of the Bradley Transportation Co., was the first large vessel through the new lock. First downbound ship to pass through the lock was the 640-foot VOORHEES of the Pittsburgh Steamship Co.

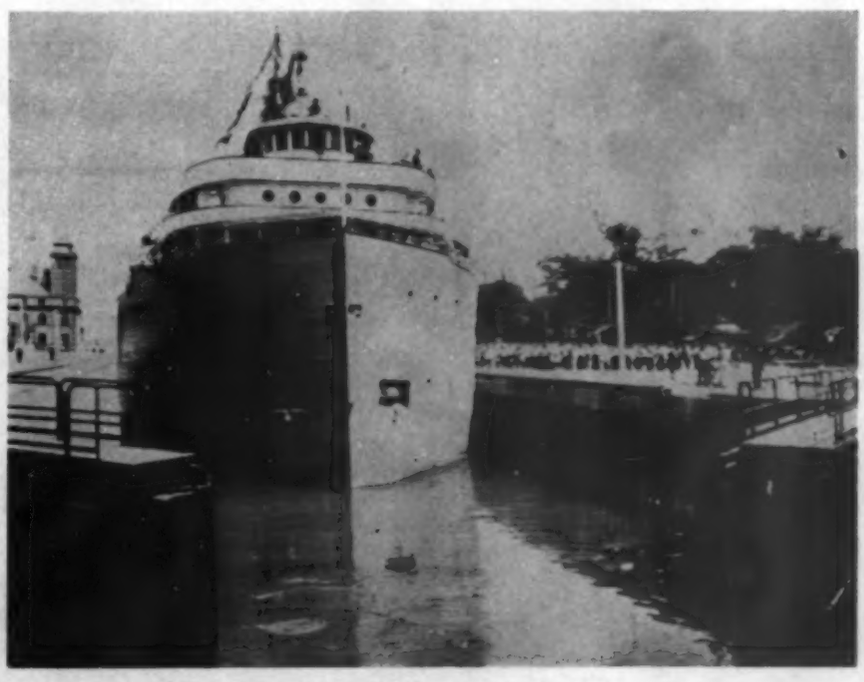
There are six Canadian boats in the ore trade, with more scheduled over the balance of the season. A month ago there were none in the trade, while last year at this time there were 35 Canadian vessels carrying ore.

Of the 313 vessels in the American Great Lakes fleet on July 15, 308 are in the ore trade, against 292 a month ago and 300 last year.

No recent change in the scheduled movement of grain and coal in relation to iron ore has been made, although it is reported considerable pressure is being brought to bear for an increase in the scheduled grain movement of 135 million bushels.

Lake coal movements from any United States port to the Buffalo and Chicago areas are scheduled at 80 per cent of the aggregate quantity moved to those areas last year; to Lake Superior ports, 110 per cent; and to all other areas 100 per cent of the quantity moved in 1942. Lake carriers are expected to ship 50 million tons of coal this season, against some 49 million last year. For the season to July 12, 16,325,291 tons of coal had been loaded into vessels at Lake Erie ports, compared with 20,768,669 same date a year ago.

Lake freighter CARL D. BRADLEY *making the first ship passage through the new* $14,000,000 *MacArthur lock at the Soo which was opened July* 11 *with appropriate ceremonies*



Campaign Progresses Despite Adverse Effects of Coal Strike

War Production Board advised over 150,000 tons on mill books for third quarter cancelled in "Share the Steel" program. . . Production outlook brightens as blast furnaces resume with coal strike virtually ended

FURTHER progress was reported last week in the "Share the Steel" campaign launched July 1 by the War Production Board's Iron and Steel Division, as part of its "Steel for Victory" drive in which it hopes to obtain 2,000,000 additional tons of steel for war production in the last half of the year.

Word received by WPB is that to date 150,000 tons of steel allotments have been canceled for third quarter due to the "Share the Steel" program, of which 140,000 tons are carbon and 10,000 tons alloy steel. A small quantity of steel also was canceled for fourth quarter.

In the Philadelphia district alone, freeing of about 50,000 tons is reported. Total covers both cancellation of existing orders on mill books and allotments authorized but not yet placed; also tonnage that was deferred until next year. In the Philadelphia area it is hoped at least 75,000 tons will be made available before the campaign ends.

Tonnage being released is said to be fairly well diversified, and it is in addition to large "as is" stocks in which the Steel Recovery Corp. is primarily interested. The total is comprised chiefly of plates, shapes and light gage sheets and strip material that had been fabricated to meet requirements, and which subsequently were changed to meet war needs.

The "Steel for Victory" drive is a three-pronged effort in which the government seeks 2,000,000 additional tons through more efficient operation of existing facilities, redistribution of allocated tonnage, and bringing in of additional capacity.

Mine Stoppage Ends

The coal strike has continued to hamper the drive, interfering with steel production especially in the Pittsburgh district. At the close of last week the mine stoppage appeared about ended with most of the 4000 miners still idle in western Pennsylvania having voted to return to work. This change of heart on the part of the laggard strikers came coincident with a federal grand jury inquiry into the matter which began July 14 presumably under the recently enacted Smith-Connally Anti-strike law.

So serious was the shortage of coal last week, Fuel Administrator Ickes, acting to "relieve the growing paralysis of the steel industry" ordered 135,000 tons of fuel diverted to steel plants, directing diversion of special-purpose metallurgical coal at the rate of 22,500 tons daily.

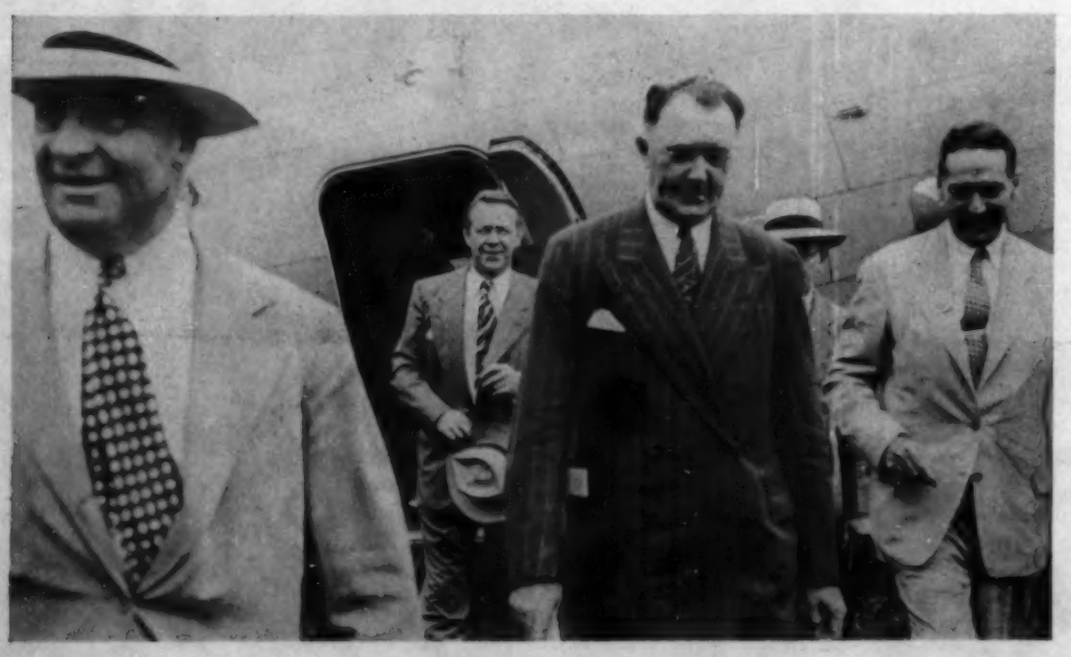
Blast furnace operations were hard hit at Pittsburgh, 12 stacks being banked early in the week. By midweek, however, three had resumed blowing and the Clairton coke works was scheduled to resume 100 per cent, as it was obvious that the situation had taken a turn for the better with the strikers in the captive mines returning to work. Hopes were high that by the end of the week operations would be resumed in all mines and that at least three more banked blast furnaces would be restored to production. The Clairton coke works had been running at 50 per cent capacity but started upping schedules July 15.

In the Youngstown district the coal strike also hampered pig iron production. Last week Carnegie-Illinois Corp.'s Ohio works was forced to slow down furnace activity in order to conserve coke. This slow-down came after operations had fully recovered from the slow-down of the preceding week.

Estimates are not available as to the amount of pig iron production lost as a result of the coal strike, but the average is believed to be about 15,000 tons a day since the beginning of the coal strike, both from stacks that were actually banked and others which were running slow to conserve coke.

Despite the banking of numerous blast furnaces, steelworks operations have been only slightly affected. In the Pittsburgh district, open hearths, however, have been more greatly dependent on scrap as a result of the curtailment in pig iron supply.

Pressing the WPB's "Steel for Victory" drive on a visit to the plant of the Lukens Steel Co., Coatesville, Pa., last week, C. E. Wilson, executive vice chairman, WPB, told employes of the steel company a shipbuilding program of 20,-



Charles E. Wilson, executive vice chairman, WPB (center), arrives at DuPont airport to visit plants of Lukens Steel Co. and its subsidiaries, Coatesville, Pa., on "Steel for Victory Drive." Robert W. Wolcott (left), Lukens president, and G. Donald Spackman, vice president in charge of operations, met Mr. Wilson and other members of the latter's party

000,000 tons this year—a 150 per cent increase over 1942—is forcing a demand for more steel shapes that must be met with increased steel production.

In welcoming Mr. Wilson and members of the WPB party, Robert W. Wolcott, Luken's president, said neither the company nor workers were satisfied with the zooming record of production established so far at Coatesville, and he pledged that his company would contribute its share of the increase in steel production that America must have in the last half of 1943.

H. G. Batcheller, vice chairman in charge of operations of WPB, said that of all the shortages, "the most critical one is in steel plates and shapes and unless we have more plates and fabricated parts, we will falter in achieving our 20,000,000-ton shipbuilding goal."

WPB Iron and Steel Division officials are scouring the country to try and ascertain just what steel inventories are in the hands of consumers. This applies particularly to any over-supply of any particular kind of steel.

While WPB officials will not discuss the matter in detail, some express the opinion they might be able to find as much as 200,000 tons in both the third and fourth quarters to help make up the 2,000,000 tons needed. WPB will not count as inventory any lend-lease material stored any place in the United States for shipment abroad in the future.

Steel production in the first half of 1943 established a new all-time record, totaling 43,866,912 net tons of ingots.

In the first six months of the year, the industry has operated at 97.9 of rated capacity, but in June the average was only 94.6.

Various steel producing and consuming areas will be visited by top War Production Board executives in the drive to get in the additional 2,000,000 tons over the remainder of the year. Meetings similar to those held in Pittsburgh July 1, and that at Coatesville, Pa., July 13, will be held in Chicago, Cleveland, Youngstown and Philadelphia in the near future, although no dates have yet been set.

Present, Past and Pending

■ SINCLAIR TO BUILD NEW PIPE LINE

NEW YORK—Sinclair Oil Corp. has started construction of a new pipe line from Chicago to Toledo, O. The project will be completed about October. Tankers and barges will carry the petroleum products to eastern points from the terminus of the 220-mile line which will run from the Chicago refining center to the western end of Lake Erie.

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■ NO FEAR OF MILITARY PLANES ON POSTWAR MARKET

NEW YORK—Harry Woodhead, president, Consolidated Vultee Aircraft Corp., declared recently aircraft manufacturers have little to fear from resale of military equipment in the immediate postwar period. He stated that with the exception of little primary trainers, military aircraft are too expensive to operate and too difficult to pilot to make them a real threat to the postwar airplane market.

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■ HALT CONSTRUCTION OF BRIDGE AND AIRPORTS

WASHINGTON—War Production Board halted construction of three CAA airports at Aurora, Ill., Purcell, Okla., and Beaver March, Oreg., in an effort to conserve materials and equipment. Construction was also halted on the $1,100,000 bridge spanning the south branch of the Chicago river at South Canal street, Chicago.

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■ ARMY MAY STANDARDIZE AIRCRAFT SOON

LOS ANGELES—American army aircraft in the near future will be standardized, four fighter models and perhaps six or eight bombers ranging from heavier than Flying Fortresses to light bomber-fighter planes, Gen. Henry H. Arnold, chief, Army Air Forces, said as he toured aircraft plants here.

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■ G-E FIRST HALF ORDERS TOTAL $941,529,000

SCHENECTADY, N. Y.—Orders received by General Electric Co. in the first six months this year amounted to $941,529,000 compared with $865,372,000 in the like period of 1942. Second quarter orders totaled $519,482,000, a decrease of 8 per cent from the $566,252,000 in the same quarter last year.

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■ PREDICTS TIGHTNESS OF GRAIN FREIGHT CARS

CHICAGO—Increased tightness in supply of freight cars available for grain shipments for western railroads during the next 90 days was predicted by Ralph Clark, manager, closed car section, Association of American Railroads before a meeting of the mid-west shippers' advisory board.

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■ WPB MAY MOVE ALUMINUM PLANT FROM COAST

WASHINGTON—War Production Board is considering transfer of part of an aluminum reduction plant in Los Angeles to New York city because of a manpower shortage on the West Coast. No final decision has been made yet.

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■ SCRAP YARD LABOR SUPPLY TIGHT

WASHINGTON—Reports reaching WPB scrap officials are to the effect yards throughout the country are having a great deal of labor trouble. Prediction is made that if the labor situation in the scrap industry is not taken care of shortly, it will lead to considerable difficulty in the near future. No complaints are being received of scrap shortage in the steel industry.

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■ PRODUCE 9000 NAVY PLANES IN FIRST HALF

WASHINGTON—More than 9000 planes were produced for the Navy during the first half of 1943, Secretary of Navy Frank Knox announces. The total equals the number built for the Navy during all of 1942 and is two and one-half times the 1941 total.

Great Lakes To Install Hot Metal Mixer Unit

Great Lakes Steel Corp., Detroit, is installing a 1400-ton hot metal mixer at its open-hearth plant to ease pressure on transport facilities from blast furnaces on Zug Island to the plant at Ecorse. Metal is now moved in mixer-cars and the new holding unit will assure adequate supply at open hearths should there be interruption to movement of cars.

Plans are under consideration for installation of bessemer converters to process hot metal before charging to open hearths but the project is still in the "if, as and when" stage.

"War Is Not in the Bag!"—Nelson

War Production Board chairman attributes recent unsatisfactory showing of munitions production to manpower shortage, absenteeism, strikes, and growing complacency

DONALD NELSON

SHORTAGE of industrial manpower, absenteeism, strikes, and a false and dangerously premature feeling that the war "is in the bag," last week were attributed by Donald M. Nelson, chairman, War Production Board, for an unsatisfactory war production showing recently.

In a radio broadcast launching the War Advertising Council's drive for "a war message in every ad," Mr. Nelson urged American business to throw its weight through advertising into the effort to shake off a production slump. He disclosed that June war production missed its $6.500,000,000 goal by one-half billion dollars.

"In order to meet the urgent demands of the armed services, huge production goals were set for 1943," Mr. Nelson said. "We are not currently meeting those goals from month to month. We are gaining in total output but that output is not rising fast enough to meet the steady rise in our production goals.

"Production in May was unsatisfactory. Production in June, although better than in May, still did not show much improvement.

"I want to state bluntly, here and now, that if we are to meet our overall schedules for 1943, the American industrial front faces a staggering job in the months ahead."

Mr. Nelson said the nation is doing a good job, pointing out, for instance, that there was a 40 per cent increase in aircraft production in the first half of the year and a 25 per cent increase in munitions output. However, he declared the showing is "not good enough" to meet the military needs of the United Nations.

The WPB chairman said that while the government is dealing with the various problems contributing to the forces retarding production progress, it needs help in making the civilian population understand the need of intensifying the war effort, and he declared "a war message in every ad" can do much to bring about another great upward surge of energy in this country—a surge that will enable us to turn out more of the stuff that our fighting men need to batter the Axis into surrender."

Joining in the radio symposium to the advertising men were Director Elmer Davis of the Office of War Information and Food Administrator Marvin Jones. Mr. Davis declared the task of mobilizing the home front to hasten victory "needs the technique that is the voice of American business—advertising." Mr. Jones said Americans must be taught that the waste of food in wartime is "a national sin," and he asked the assistance of business in teaching conservation.

Shifts in the military program held May munitions production to the April level. Last week the War Production Board reported its munitions index for May was 563 (based on November 1941 as 100), the same as the revised April figure.

Munitions now are being produced at a rate of $60,000,000,000 a year, and the total for the twelve month period is expected to run beyond $65,000,000,000. Aircraft and related equipment gained 5 per cent in May over April. Production of Army and Navy vessels and Army ordnance equipment gained 2 per cent. Completion of naval vessels scored an increase of 30 per cent over April and 9 per cent over the best previous month. Ground ordnance declined 3 per cent. Merchant vessels declined 3 per cent, munitions output dropped 7 per cent, while military automotive vehicle production rose 3 per cent.

The merchant ship program for the year is understood to be the most advanced with 44 per cent of the ship objective completed by June 30. Army ordnance and output of naval vessels are estimated at 40 per cent. The aircraft program is 33 per cent complete.

SICILY'S RESOURCES

Invasion of Sicily by the combined forces of the United States, Canada and England marks another momentous step in opening a second front on the European continent. But the island is of little industrial significance to the United Nations because its population is largely devoted to agriculture and fishing.

The Axis, however, through loss of Sicily will be cut off from another source of vitally needed mineral, for a great amount of sulphur is mined on the island.

Sulphur is the most important Sicilian mineral, it being mined principally in Caltanissetta and Girgenti and in minor quantities in Palermo and Catania. Another Sicilian industry is the mining of common salt and rock salt.

Sicily consumes iron and steel in her agricultural industries. Wine, olives, olive oil, lemons and oranges are exported.

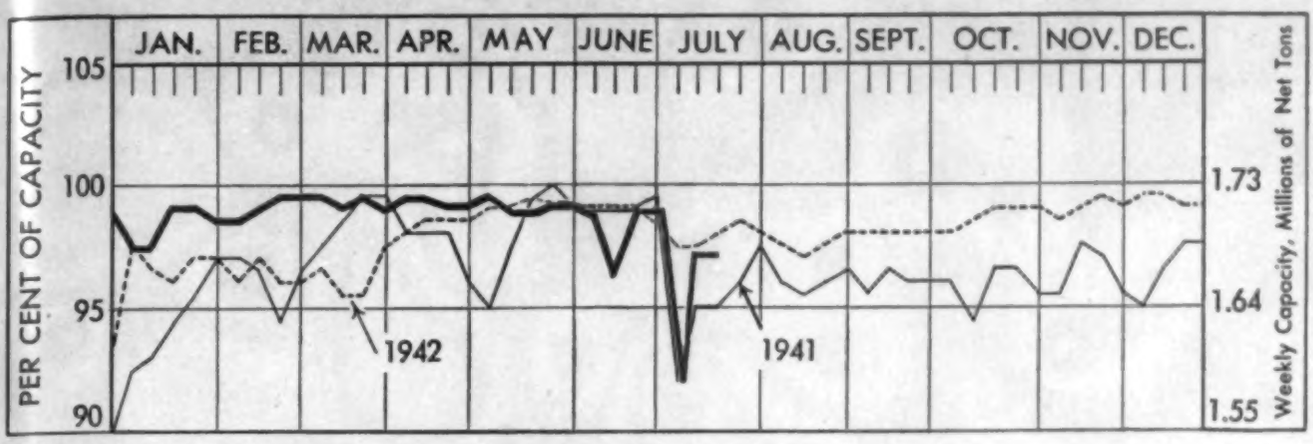
WLB Extends Membership Clauses in Two Contracts

Acting upon requests of two subsidiary companies of the United States Steel Corp., Oil Well Supply Co., Oil City, Pa., and the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., the National War Labor Board last week announced it unanimously approved the extension of maintenance of membership clauses in the companies' contracts with the United Steelworkers of America, CIO, to cover two plants where the union has won bargaining rights.

Labor Board Asserts Right To Suspend Union Shop

The Cleveland regional War Labor Board made two far-reaching decisions last week. In one, involving a dispute between the A. F. of L. and C. I. O. United Automobile Workers unions at the Trailer Co. of America, Cincinnati, the regional WLB declared its authority to suspend temporarily a union shop clause in a contract when, in its opinion, the war effort requires it.

In the other, involving the National Carbon Co., Edgewater plant, in Cleveland and the United Electrical, Radio and Machine Workers of America, it announced a policy of ordering compulsory, instead of voluntary, check-off in all cases in which it orders maintenance of membership and the union requests the check-off.



STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,424	6,826	7,670	7,374	7,545	7,027	....	....	....	....	....	....
1942	7,112	6,512	7,392	7,122	7,382	7,022	7,148	7,233	7,067	7,584	7,184	7,303
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150

PIG IRON PRODUCTION

1943	5,194	4,766	5,314	5,035	5,178	....	....	....	....	....	....	....
1942	4,983	4,500	5,053	4,896	5,073	4,935	5,051	5,009	4,937	5,236	5,083	5,201
1941	4,666	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,707	5,014

Ingot Rate 97%

Coal strike effect being overcome. Blast furnaces off for relining

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week was unchanged at 97 per cent of capacity. Seven districts made small gains, two declined and three were unchanged. A year ago the rate was 98 per cent; two years ago it was 95 per cent, both based on capacities as of those dates.

Greatest loss in production was in the Pittsburgh district, which fell 4 points to 93 per cent, as a result of the coal strike. Gains at other points substantially balanced this decline.

Carnegie-Illinois Steel Corp. has blown out its No. 4 stack at Mingo Junction, O., for relining, leaving two furnaces active in that area.

Carnegie-Illinois Steel Corp. blew out its Gary No. 3 blast furnace July 14 for relining. This is the only one of the 39 stacks in the Chicago district not operating.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended July 17	Change	Same Week 1942	Same Week 1941
Pittsburgh	93	— 4	94	99.5
Chicago	99.5	+ 1.5	102	100
Eastern Pa.	93	None	98	97
Youngstown	97	+ 3	96	98
Wheeling	90	+ 3	83.5	91
Cleveland	94	+ 1.5	94.5	95
Buffalo	93	+ 3	93	93
Birmingham	95	None	95	90
New England	95	None	90	95
Cincinnati	92	+ 3	88.5	85.5
St. Louis	97	+ 2	95.5	98
Detroit	90	— 2	85	86
Average	97	None	*98.0	*95.0

*Computed on bases of steelmaking capacity as of these dates.

Canadian Steel Production Shows Slight Gain in May

While steel and iron production in Canada in May showed a small gain over the April rate, for the five months ending May 31 steel output is off 3.6 per cent and pig iron 12 per cent from the high record made during the comparable months in 1942.

Steel ingot and castings production in May was 271,737 net tons, of which 259,289 tons were ingots. Pig iron output totaled 154,746 tons, of which 124,315 tons were basic, 15,505 tons foundry and 14,926 tons malleable.

During May production capacity for steel castings was increased by 2950 net tons, Steel Co. of Canada Ltd. putting into production recently a new electric furnace at its Hamilton, Ont., works. It is the largest electric furnace in Canada. This accession increases annual rated capacity for steel castings to 281,600 tons and total steel furnace capacity to 3,453,600 tons per year.

Comparative production figures for May and prior months are as follows:

	Steel Ingots Castings	Pig Iron	Ferro-alloys
May, 1943	271,737	154,746	17,971
April, 1943	264,357	150,486	18,698
May, 1942	272,247	171,386	19,428
5 Mos. 1943	1,259,652	719,900	93,642
5 Mos. 1942	1,305,075	806,039	93,179
5 Mos. 1940	1,076,624	574,827	81,963

Steel Shipments

Lowest since February for U. S. Steel Corp. Total was 1,552,663 net tons in June

EFFECT on the steel industry of coal mining interruptions are reflected in shipments of finished steel by United States Steel Corp. subsidiaries in June. These totaled 1,552,663 net tons, lowest for any month since February, 1941, when they were 1,548,451 tons. There were only 24 working days in February, 1941, compared with 26 last month.

June shipments were 153,880 tons less than the 1,706,543 tons of May and compared with 1,774,068 in June, 1942, a decrease of 221,405 tons. June, 1941, shipments which totaled 1,668,637 net tons exceeded last month's total also.

On the basis of daily average shipments June showed 59,718 tons, a decline of 5918 tons from 65,636 tons in May and 8515 tons from the 68,233 tons average in June, 1942.

(Inter-company shipments not included)

Net Tons

	1943	1942	1941	1940
Jan.	1,685,992	1,738,893	1,682,454	1,145,592
Feb.	1,691,592	1,616,587	1,548,451	1,009,256
Mar.	1,772,397	1,780,938	1,720,366	931,905
Apr.	1,630,828	1,758,894	1,687,674	907,904
May	1,706,543	1,834,127	1,745,295	1,084,057
June	1,552,663	1,774,068	1,668,637	1,209,684
July	.....	1,765,749	1,606,667	1,206,887
Aug.	.....	1,788,650	1,753,605	1,455,604
Sept.	.....	1,703,570	1,664,227	1,392,538
Oct.	.....	1,787,501	1,851,279	1,872,408
Nov.	.....	1,605,545	1,624,186	1,425,352
Dec.	.....	1,849,635	1,846,036	1,544,623
Total	.....	21,064,157	20,458,937	14,976,110
Adjustment	.....	.....	*42,333	†37,639
Total	.....	.....	20,416,604	15,013,749

†Increase. *Decrease.

Shifting of Top Personnel of WPB Division Continues

N. W. Foy advanced to post of deputy director. . . . J. L. Block, assistant director for distribution. . . . C. H. Longfield, assistant director and chairman of production directive committee. . . . J. V. Honeycutt, assistant director for production

SHIFTING of top personnel of the Steel Division, War Production Board, continues. At the same time a new subdivision to deal with manpower problems has been set up in the division, it was announced last week.

The most recent personnel changes involve the following men, identified by their positions before coming to Washington in 1941: Norman W. Foy, general manager of sales, Republic Steel Corp., Cleveland; Joseph L. Block, executive vice president, Inland Steel Co., Chicago; Jesse V. Honeycutt, assistant vice president in charge of sales, Bethlehem Steel Co., Bethlehem, Pa.; and Charles H. Longfield, general manager of sales, Youngstown Sheet & Tube Co., Youngstown, O.

Mr. Foy has been appointed deputy director of the Steel Division and his former position as assistant director for distribution will be filled by Mr. Block, who has been chairman of the division's Production Directive committee since its inception.

Mr. Longfield has been named assistant director and chairman of the Production Directive committee and previously was chief of the Tubular Products and Tin Plate Branch.

Mr. Honeycutt, who has been chief of the Wire and Heavy Products Branch, has been appointed assistant director for production, succeeding David F. Austin who resigned recently to return to his post with Carnegie-Illinois Steel Corp.

A new position, assistant director of the Division for Manpower, will be filled by Harold J. Ruttenberg, Pittsburgh, formerly special assistant to the director of the Steel Division. Before joining the division in November, 1942, Mr. Ruttenberg was research director for the United Steel Workers of America (CIO).

At the end of June, Hiland G. Batcheller, who had been director of the Steel Division since September, 1942, was elevated to operations vice chairman of WPB. Reporting to him now are all of the industry, conservation, salvage and redistribution divisions together with the deputy vice chairman for field operations. Mr. Batcheller is president of Allegheny Ludlum Steel Corp., Brackenridge, Pa.

Vacancy in the directorship of the Steel Division was filled by elevating John T. Whiting, president of Alan Wood Steel Co., Conshohocken, Pa., from his former post as deputy director.

Vital role of the Steel Division in the war production program has intensified considerably under operation of the Controlled Materials Plan. It is charged with supervision of steel production and the distribution of steel products. It must prepare and submit to the CMP Requirements committee statements of requirements of each claimant agency and of total anticipated supply of steel as well as recommendations as to the appropriate reconciliation between aggregate requirements and anticipated supply.

In addition, the division is responsible for obtaining requisite production of steel in the forms required; for balancing such production and its distribution within the scope of its jurisdiction; for checking allotments insofar as this is possible in connection with steel orders placed with producers; and for recommending appropriate action to make the most efficient use of steel through changing specifications, substitution, simplifying production and adoption of other conservation practices. The division is authorized to issue production directives to steel producers, directing them to produce specified tonnages per month of certain shapes, forms and sizes.

Metals Reserve Co. Buying Surplus Steel Valve Stocks

Redistribution Division, War Production Board, is calling upon all users of new high-pressure steel valves to list their surplus items on form WPB-2844. They also are asked to indicate whether they are willing to sell such valves to the government. If those sold must be replaced later, the holders are asked to indicate the desired replacement date so that arrangements for replacement can be made now with the manufacturers.

Surplus valves are to be purchased by the Metals Reserve Co. through its agency, Murray Cook, at market prices and resold to valve manufacturers to help them meet orders now on their books.

NORMAN W. FOY

JOSEPH L. BLOCK

C. H. LONGFIELD

J. V. HONEYCUTT

Seeks To Stretch Tin Supplies

WPB Tin-Lead Division director points to need for conservation. Steel as much as tin held key to tin plate situation. States new electrolytic plate used as fast as it became available

WHILE, fortunately, we have fair stocks of tin in this country, it is the considered opinion of the War Production Board that the nation's supply of tin should be stretched as far as possible without dislocating any military or essential civilian requirements, states E. Vogelsang, director, Tin-Lead Division, War Production Board, in a letter to the editor of STEEL in which he takes exception to certain statements made in an article on tin and tin plate appearing in STEEL, issue of July 5.

Mr. Vogelsang's letter in full follows:

To the Editor of STEEL:

"In STEEL July 5th, there appears an article entitled 'Producers Believe Restrictions on Tin Can Be Lifted.'

"There are too many errors in this article to permit them to go unchallenged.

"It is granted that, fortunately, we have a fair sized stock of tin in the country; however, as long as our enemies occupy the Far Eastern producing areas, the supplies available to us will be substantially under the minimum requirements and the stock will be depleted for the duration of hostilities, and in addition until such time as we can rebuild tin producing facilities in the Far Eastern areas after they are recaptured. For this reason, it is the considered opinion of the War Production Board that our supply of tin should be stretched as far as possible without dislocating any military or essential civilian requirements.

Conserve Available Supply

"This principle of conserving available supplies of a critical material is being pursued by the Tin-Lead and Conservation Divisions of the War Production Board in the case of tin for tin plate just as in the case of our other critical materials. It is our aim to insure maximum production and distribution of all commodities essential to the war program, including articles of food. With the over-all material shortage facing us it is necessary to use the least critical container material in all instances just as we have the co-operation of the Army and Navy in using the least critical suitable materials for planes, tanks, ships and guns. Bulk shipments of dehydrated or frozen foods ordinarily require less packaging material. Where small unit containers are essential, these should preferably be made from one of the following materials selected as early in the list as possible: (1) paper, (2) glass, (3) black plate, with or without bonderized and lacquered coating, (4) electrolytic tin plate, (5) hot dipped tin coating and using the lowest practical thickness of tin. Maximum accomplishment of conservation in packaging necessitates restriction in the usage of each of these types of containers where less critical container material for bulk shipments would suffice. With current reductions in the rate of steel output serious interference is being encountered with essential military programs and no steel product should be specified where packaging of a non-essential commodity is involved or where a less critical material would suffice for packaging an essential commodity.

"The article states 'it is difficult to understand why the electrolytic tin plate program was made so large.'

"This program is an entirely voluntary one initiated by the tin plate industry immediately after Pearl Harbor. Naturally government officials were pleased with the foresight of the tin plate industry in undertaking this major conservation measure but no suggestion or recommendation as to the size of the program was offered to our knowledge by any government official.

"At no time since our entry into the war when restrictions and control measures were put into effect has tin plate production suffered because of the restricted use of tin. Steel has been allocated to the tin plate industry on the basis of requirements for essential packing and tin has been allocated to coat this steel, using the lightest possible coating. Supplies of steel just as much as tin are the key to the situation.

"It was stated in the article that the electrolytic tin plate program will be permitted to operate at only partial capacity. To date, we have used electrolytic tin plate almost as fast as it has become available and more would have been used if it had been available in time for such packs as peas and corn. In making this statement we do not wish to reflect upon the ability of the producers, since they, like everyone else, have had difficulty obtaining critical components for their equipment.

"It was further stated that the chief stumbling block in the electrolytic tin plate program is the fact that the Army and Lend-Lease require hot dipped plate for their overseas shipments, and for this reason such heavy tonnage items, as army field ration cans, oil cans, etc., are manufactured from hot dipped tin plate. This is definitely not the case. With the exception of meat, which is now under consideration, the Army and Lend-Lease have agreed to accept for export electrolytic tin plate cans for all products which are packed in electrolytic cans for domestic consumption. Oil cans have not been manufactured from tin plate in many years, and at the present time the Army is not buying any of these containers except those which are manufactured from frozen stocks of terne plate.

"Obviously any new development such as electrolytic tin plating has many 'bugs' to contend with, but tin plate manufacturers, can manufacturers and canners are to be commended for their efforts in gradually overcoming many of the difficulties. By the end of 1943 or early 1944, an increasing number of products will be packed in electrolytic plate so that the new lines should operate at fair capacity.

E. Vogelsang,
Director, Tin-Lead Division
War Production Board"

GOVERNMENT'S VIEW

Discussion of the tin and tin plate situation in STEEL, page 62, July 5th issue, to which exception is taken in the accompanying letter to the editor from E. Vogelsang, director, Tin-Lead Division, War Production Board, reflected the viewpoint of industry as obtained by STEEL's representative through interviews with responsible production executives. STEEL is pleased to present the government's views on the subject given in Mr. Vogelsang's letter.

Maxon Resigns OPA Post

Charging that the Office of Price Administration is hampered in its work by its own internal weakness, Lou R. Maxon has resigned as deputy administrator in charge of information. Mr. Maxon came to Washington early this year from his Detroit advertising firm, Maxon Inc.

WINDOWS of WASHINGTON

No Sounding Board

THE QUARREL between Vice President Henry Wallace, in his capacity as head of the Board of Economic Warfare, and Jesse Jones, as head of Reconstruction Finance Corp. and its subsidiaries, apparently will not have a sounding board in Congress if Democratic members have their way.

Senator Bridges' resolution asking a Senate investigation was referred not to the Senate Military Affairs Committee but instead to the Senate Banking Committee. The Military Affairs Committee is headed by Senator Reynolds, who frequently criticizes the administration, whereas the chairman of the Banking Committee is Senator Wagner of New York, a leading new dealer. Hence it remains to be seen whether Mr. Jones is guilty, as charged, of delaying purchases of strategic materials.

At the same time, the natural feeling among the Democrats as a whole being they want to avoid a blow to the party in general, the struggle between regular Democrats and New Dealers continually brings new moves. One of the latest is a proposal by Representative Sumners of Texas that the constitution be amended to permit Congress to override a veto with a simple majority.

Improving

Signs are beginning to develop that the railroad transportation situation in Mexico will improve shortly. Since Mexican railroad labor sometime back decided to select their supervisors and foremen by electing them, things had been going from bad to worse. On June 16, the Association of American Railroads, with the approval of the Office of Defense Transportation embargoed shipments across the border at Laredo, Eagle Pass and Brownsville, Tex., because of congestion resulting from the inability of the National Railways of Mexico to accept the cars and haul them to destination. More than 600 cars were waiting transfer across the border at Laredo alone on that date.

As this is written the situation has improved somewhat, there now being 466 cars on hand at Laredo.

Control of the transfer of cars across the Mexican boundary is essential for another reason. That is the tendency of the Mexican railroad authorities to delay return of the cars. They use them on their own lines and return them when in bad order. Hence it is necessary to limit the number of cars going across the border to approximately the number of the returns.

About two months ago the elected officers, supervisors and foremen were replaced by the former officers, and the former supervisory personnel took over their old jobs—and that is the reason things are going better.

There are numerous exemptions to the embargo alluded to above. Shipments of materials for railroad use, shipments going under government bills of lading, supplies for a number of Mexican contractors that are working under United States contracts are exempted, while permits are issued in certain other instances. It is more a matter of controlling rather than of stopping the flow.

JUST FANCY

OPA has a new word marvel. It's "rationale" and is regarded by its lawyer-inventors as much smarter and fancier than "directive," "co-ordinator" etc.

The dictionary defines rationale as "an explanation or exposition of the principles of some opinion, action, hypothesis, phenomenon or the like. Now rare."

At OPA the word is defined as "a statement of considerations."

First rationale to be issued is one in which bowling alley operators are permitted to buy shoes to rent to patrons, "ten pairs of bowling shoes per alley for the first four alleys and seven pairs of shoes per alley for every alley above four."

One part of the order stipulates no pair of shoes may be rented or loaned for a period longer than 12 hours at a time to the same person. That should be long enough to let the hardiest individual get his fill of bowling.

Not So Tough

Despite his tough exterior, there is no more tender-hearted man in Washington than Charles E. Wilson, former General Electric Co. president, who now is vice chairman of the War Production Board.

He feels his responsibility keenly and is applying pressure wherever it seems to be needed to make sure that our troops are supplied with plenty of everything so that they can get the war finished with the least possible expenditure of blood.

"I want to do a job now that will enable me to look the boys in the eye when they get back," he says. Then he chokes up and changes the subject.

Good Question

A very embarrassing question just has been handed on by the Civil Service Commission to the various federal agencies. The question is: "How many incompetent employes have you fired in the last five years?" The question is an entirely unnecessary one for everybody knows the answer, including the Civil Service Commission.

The answer is that government agencies do not fire incompetents. It just is not done. It is the habit to let a small percentage of incompetents coast along on the work done by the great majority.

The Civil Service Commission did not ask this question of its own invention. It was prodded into action by the Ramspeck Investigation Committee which is very much interested in the wasting of taxpayers' money through inefficiency in government. Now that the question has been asked, answers must be forthcoming. It will be very interesting to see what the heads of the various agencies will have to say on this matter.

Bad Reputation

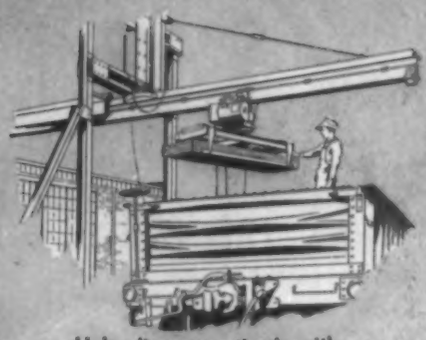
Uncle Sam always has had a bad reputation among the Indians for not keeping his word—and this failure to abide by solemnly executed treaties continues right up to the moment. In 1902 the government entered into an agreement with the Choctaw and Chicksaw nations to the effect that it would dispose of tribal lands in Oklahoma or, in the event of failure to make a proper disposition, take the lands over and pay for them out of public funds. The agreement never was carried out and the Indians are getting impatient over what they regard as unfair treatment to government "wards."

Now under discussion before the Senate Indian Affairs Committee is S. 314 introduced by Senator Elmer Thomas of Oklahoma. It is aimed to right this wrong.

A notable feature of these hearings is the impressive caliber of the tribesmen who come to state their reasons for asking passage of the bill. They include such men as Governor Kerr of Oklahoma, a member of the state supreme court and numerous others who occupy high places in the state government or in private industry.

Under questioning, they tell an impressive story about the feats of Choctaw and Chicksaw Indians in this war. With respect to the coal involved, some of the witnesses said, there is enough of it in Oklahoma to supply the Southwest "for 100 years."

Free moving hand cranes with electric hoist handles 3-ton loads easily.



Unloading crane ties in with plant storage area.

Racks handle finished parts through drying ovens.

FOR THE DURATION AND LONG AFTERWARDS

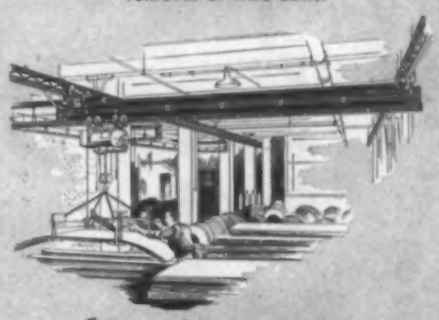
American MonoRail Equipment offers versatile application without costly adjustment or lengthy engineering.

YOU can better your production NOW—later in the post-war period you will have essential equipment available for changes in product or process.

American MonoRail handling equipment is extremely flexible. Standard parts fit quickly and easily into complete systems that solve a wide range of handling problems.

Don't let your handling problems impede your war work. Let our engineers show you how to speed up NOW with an eye on easy, inexpensive adjustment when Victory is ours.

Stripping crane speeds up removal of wire coils.



Crane over storage area moves steel easily.

THE AMERICAN MONORAIL CO.

13102 ATHENS AVENUE ★ CLEVELAND, OHIO

What Will Be Done To Soften Shock of Transition to Peace?

Two bills now before legislators aim to intelligently handle the problems certain to develop in connection with the disposal of surplus war materials, machinery and plant with minimum disturbance to postwar business and industry

TO MAKE sure the problem of disposing of surplus goods of all kinds after the war will be handled intelligently and in a way to provide minimum shock to postwar business activities, Congress is expected, soon after it reconvenes after the summer recess, to take action on two bills aimed at this objective.

One of them is H.R. 2795, passed by the House on June 9. This is expected to come up for hearings before the Senate Committee on Expenditures in the Executive Department after Labor day.

The other is H.R. 2959, which as yet has had no detailed consideration but which is sure to come up for hearings.

Under H.R. 2795 all surplus property in the hands of the Army, the Navy, the Maritime Commission and other government procurement agencies would be reported to the director of the Bureau of the Budget and the Procurement Division of the Treasury Department and the surplus property disposed of under regulations to be prescribed by the President.

By "property," as defined in this bill, is meant surplus machine tools and other equipment in government owned plants, as well as the huge inventories of a vast assortment of items of countless diversity that will be in the hands of the armed forces at the conclusion of the war. The bill exempts only government-owned land, buildings, "or their appurtenant facilities or fixtures or any gold or silver." The thinking at the capitol about postwar use of government-owned plants has not yet crystallized sufficiently to permit the shaping of legislation at this time.

H.R. 2795 merely is an instrument establishing machinery under which disposal of surplus government-owned property could be effected in an orderly and controlled manner. It is to be expected that the Senate will vote in favor of it and that the President will give it his signature. To guard against the possibility that the President and the government agencies given powers under this bill may not be misused, a safeguard is contained. The bill calls for establishment of a Surplus War Property Committee to be made up of five members of the Senate and five members of the House. It would be the duty of this committee "to undertake promptly a full and complete study and investigation of the types, quantities, values, location and custody of war materials and other tangible property, both real and personal, acquired, held, or utilized for military purposes, which may reasonably be expected to be in the possession or under the control of any agency at the time of cessation of hostilities in the present war and no longer needed for such purposes." This study would start immediately after enactment of the bill and the committee would be required within six months at most to report results of its investigation and submit recommendations for further legislation aimed at insuring an orderly process of liquidation. This committee also would be charged with observing the administration of the act.

When H.R. 2959 comes up for hearings it is certain that many manufacturers will want to come to Washington to tell their stories. This bill provides for the "Disposition and Control of Surplus Aircraft by the Civil Aeronautics Board." This bill would place in the lap of the Civil Aeronautics Board the full responsibility of determining the disposition of "unused or surplus aircraft owned by the United States, and the licensing of the import and export of aircraft so as to—

"Prevent, to the extent possible, any adverse effect upon the economic soundness, efficiency, or safety of the national and international air transport system of this country and any interference with the execution by the board of . . . this act;

"Meet the demand and need for aircraft or parts thereof by commercial operators of aircraft in the United States for the initiation and expansion of operations necessary to assure the sound and uninterrupted development of interstate and foreign commerce by air;

"Meet the demand and need for aircraft or parts thereof by persons in the United States other than commercial operators of aircraft necessary to assure the sound and uninterrupted development of civil aeronautics;

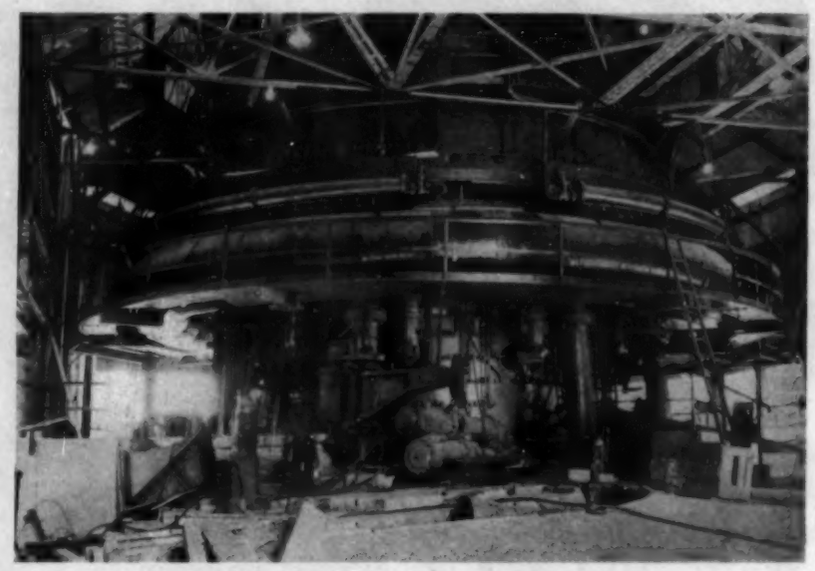
"Prevent, to the extent practicable, the creation of burden upon other available markets for aircraft in the United States;

"Achieve and preserve the economic soundness, and production capacity for commercial military and other aircraft, of the aircraft manufacturing industry in the United States during and after conversion to a peacetime basis;

"The protection, to the extent possible, of the financial interest of the United States in unused or surplus aircraft;

"Meet the demand and need for aircraft or parts thereof by any foreign country or the citizens or subjects thereof;

"Meet any obligations assumed by the United States in any treaty, convention or



BLAST FURNACE: Cast house of the new blast furnace at Columbia Steel Co.'s Ironton plant, near Provo, Utah, now is in operation. Furnace was moved piece-meal from Joliet, Ill., by this United States Steel Corp. subsidiary under government direction. Daily capacity is 950 tons

agreement that may be in force between the United States and any foreign country or countries; and

"Comply with other relevant national policies of the United States, particularly those in the field of foreign relations."

The bill calls for establishment of an Aircraft Advisory Board to consist of one member each from the following federal departments: Treasury, War, State, Navy and Commerce. It will be noted that under it the President is to have no authority whatever over disposal of surplus government-owned aircraft.

That Congress fully realizes that this process of disposal will offer difficult problems, particularly because airline operators will want to buy up this equipment cheaply and get it in the air in large numbers whereas the aircraft manufacturers want it scrapped pretty largely and replaced by new planes to be manufactured after the war is over, is reflected by a provision for a fine up to $10,000 and imprisonment up to two years for "any person who knowingly and wilfully violates any provision . . . for the purpose of injuring in any way the action of the board or for the purpose of obtaining a license, money, property, or anything of value."

H.R. 2959 was introdueed June 15 by Representative Andrew J. May (D. Ky.). It was referred to the House Committee on Interstate and Foreign Commerce which will conduct the hearings on it.

Straw Shows Way Wind Blows

Failure to extend Guffey Coal act beyond the Aug. 23 deadline seen as reflecting mounting disposition of the legislative branch of the government to discourage widespread use of such bureaucratic controls in postwar era

WHEN Congress refused to extend the Guffey Coal act beyond Aug. 23, one of its principal reasons was that it wanted to discourage widespread use of such bureaucratic controls in the postwar world.

In taking its action, Congress upset administration officials who believe that such controls are necessary to prevent dislocations in the economy.

This point of view was brought out with particular emphasis when the House Ways and Means Committee questioned Howard A. Gray, deputy solid fuels coordinator for war. Mr. Gray is an appointee of Secretary Harold L. Ickes, who also holds the post of solid fuels co-ordinator for war. Representative A. Willis Robertson (D. Va.) asked Mr. Gray if he would favor a "Guffey act" for iron mines.

"If conditions in the iron mines are such as they were in the coal mines prior to the Guffey act, I would say 'undoubtedly, yes, sir.' But I know nothing of the conditions in the iron mines," Mr. Gray replied.

Then came these questions and answers:

Mr. Robertson: "How about copper mines? Do you favor the government exercising control over them and fixing it so they can pay any wage authorized by the War Labor Board and still come out on top?"

Mr. Gray: "If conditions were the same as they were in the coal mines prior to the passage of the Guffey act I say you should have regulation the same as under the Guffey act."

Mr. Robertson: "How about the manufacturers of steel? Suppose after the war is over they find they have a capacity of 100,000,000 tons and a market for 40,000,000 tons, and they are very much disorganized, just as disorganized as they were at the end of World War I, should the government step in and fix the price of steel too, in order to pay wages that were paid during the war to the steelworkers?"

Mr. Gray: "If the steel conditions are such as they are in the coal mines, I would say 'Yes, sir!' "

To show the way which the wind was blowing the following comment by Representative Wesley E. Disney (D. Okla.) is illuminating: "By that time (October, 1940) the coal industry had 'stabilized' itself so that it was making $15,000,000 net. But the argument for establishing the bureau was that it was supposed to stabilize the industry. We do not want such stabilization extended into the postwar world. Nor did we want to extend the act now merely to stabilize John Lewis' wartime strikes and give him power to continue to say that only the government can operate the coal mines."

This and other portions of the record prove that Congress did not kill the Guffey act merely to force 1200 government employes off the payroll with an accompanying saving of $3,000,000 a year, and to save 29 cents a ton to consumers. Congress is worried about federal domestic policies, about the arbitrary methods of government bureaus, about regimentation. Congress is worried over the need for high taxes.

That is the reason behind the decisions to kill off the National Youth Administration and the National Resources Planning Board and certain other agencies.

Congress is also worried over the inflation threat and it is safe to expect when it reconvenes after its summer recess it will take more effective action in this direction than up to this time. And what their constituents tell congressmen during the vacation will have a large bearing on what they do when they get back to Washington.

U. S. Treasury Loans Silver to Great Britain

Shipments of silver, totaling 3,075,000 ounces, supplied to Great Britain by the United States under lend-lease, have arrived in the United Kingdom to help relieve a serious shortage. The shipments, which were from stocks of treasury free silver, were made available to Great Britain with the understanding that they be returned on an ounce-for-ounce basis after the end of the war.

Britain's silver requirements for the first half of 1943, in addition to supplies from sources other than the United States and Canada, totaled 5,000,000 ounces, and of this Canada has agreed to supply 1,925,000 ounces. The United States and Canadian governments have indicated their willingness to supply additional silver to Britain for essential war uses, including coinage, as long as the silver is not more urgently needed in their domestic economies.

New Guide Issued on Use Of Construction Materials

A new issue of the Critical Construction Materials Guide, is now available from the Conservation Division of War Production Board. The new guide supersedes the issue of Feb. 19, 1943, and while the revisions involved are minor in most cases, the entire guide has been revamped and printed on a new format with new classifications.

In general, the tendency is to eliminate specific prohibitions and substitute for them general classifications under which WPB can either accept or reject applications for critical materials to be used in construction. The new form will permit considerable increase in flexibility and is intended to encourage construction engineers, architects and designers to use more critical materials where necessary and desirable and permit WPB to determine advisability of use. Previous editions encouraged the elimination of use of critical materials where possible.

PRIORITIES-ALLOCATIONS-PRICES

Weekly summaries of orders and regulations, together with official interpretations and directives, issued by War Production Board and Office of Price Administration

INSTRUCTIONS

CMP-24: Aluminum fabricators and distributors, including companies making rough pattern castings, now are required to show, as a part of their CMP allotment number, the quarter in which they are authorized to place their CMP allotment instead of the two digits representing requested month of delivery. They must show a requested month or date of delivery which must be no earlier than they will need the metal in accordance with their authorized production schedule.

They also are cautioned in accepting orders and in posting them to form CMP-24 to be sure that these are transcribed correctly and that the customer has given what appears to be a reasonable program number. Their attention is directed to the provision which requires them to report to WPB all orders undelivered more than 30 days after the end of the requested month of delivery.

The large amount of unfilled orders reported by many fabricators, particularly foundries, indicates they have not observed the provision stating that no producer (except those operating under specific WPB production directives) shall accept a total order load for any month in excess of 105% of his capacity.

WIRE MILLS: Clarifying a recent report, Copper Division has issued the following statement: "All direct shipment orders placed on wire mills by warehouses which bear only preference ratings were automatically cancelled by wire mills when CMP became effective July 1. However, electrical warehouses may ship on both authorized controlled material orders and preference rated orders under CMP regulation No. 4, provided shipment is made from warehouse stock."

PREFERENCE RATING: Assignment of an AA-1 preference rating for all of the 100-octane aviation gasoline plants that are scheduled for completion in 1943 has been announced. Some of these projects previously had an AA-2X rating.

DISTRIBUTORS' FORM: WPB-547 now supersedes form PD-1X, used by distributors in obtaining priority assistance for replacing inventories. PD-1X applications will be accepted for processing until Aug. 1; after that date, only WPB-547 will be valid.

CMP REGULATIONS

HAND TOOLS: Employes may use under specific circumstances CMP regulation No. 5 preference ratings assigned to their employers for maintenance, repair and operating supplies, to purchase hand tools required to retain or obtain employment. Employers are permitted to purchase such items as hand tools for release to employes, even though this has not been a customary business practice in the past.

An AA-1 preference rating is granted to radio communications by including this activity in Schedule I. Analytical, research, testing and control laboratories have been removed from Schedule I of the regulation and are thereby denied use of AA-1 preference rating. Persons producing identification plates, emblems, badges, pin tickets and tags have been granted use of the AA-2 rating for MRO supplies by the inclusion of such activities in Schedule II. (CMP No. 5)

COPPER WIRE: Farmers may obtain "Copper Wire Allotment Certificates" from USDA War Boards on basis of applications which show actual need of copper wire for farm operations in excess of the 75 feet permitted under Priorities regulation No. 19. Retailers may place orders on warehouses or mills for the amount of wire shown on the certificate and attach the certificate to the order. Order is then an authorized controlled material order. If retailer prefers, he may place an authorized controlled material order for amount of wire shown on the certificate by placing on his order the allotment number appearing on the "Copper Wire Allotment Certificate," followed by the quarterly identification and endorsing the order with a prescribed certification. (CMP No. 1)

E ORDERS

MACHINE TOOLS: Order E-1-b has been amended to prevent under any circumstances shipment of machine tools to dealers for stock. Sequence of delivery among the 25% of production allotted to foreign and "other-than-service" purchasers is now determined by date of receipt of the preference rating certificate, whenever the rating is A-1-a or higher. If lower than A-1-a, sequence of deliveries is determined by preference ratings. (E-1-b)

INDEX OF ORDER REVISIONS

Subject	Designations
Carriages, Baby	L-152
Coolers, Water	L-126
Dehydrators, Food	L-308
Facsimiles	PR No. 7
Fence Posts, Steel	L-211
Heat Exchangers	L-172
License Plates	L-32-a
Sewerage Facilities	P-141
Sterilizers	L-266
Tools, Hand	CMP No. 5
Tools, Machine	E-1-b
Trucks, Industrial Power	L-112
Welding Equipment	L-298
Wire, Copper	CMP No. 1, L-63
Price Regulations	
Copper Scrap	No. 20
Machinery	No. 136

L ORDERS

LICENSE PLATES: States are permitted to use metal on hand, or sheet and strip steel not heavier than 22 gage and listed as idle or excess inventory with Steel Recovery Corp., for purpose of manufacturing one 1944 license plate per motor vehicle. Specific authorization of WPB must be obtained to purchase steel listed with the corporation. (L-32-a)

COPPER WIRE: All bare or insulated wire or cable for electrical conduction, made from copper or copper-base alloy, in distributors' stocks have been released from inventory restrictions of order L-63. Inventory control is now exercised by WPB under CMP regulation No. 4. (L-63)

POWER TRUCKS: Purchase orders for used industrial power trucks must be authorized by WPB before they can be accepted. Authorizations of acceptance are made on form WPB-1319 (formerly PD-556). (L-112)

Additional manufacturers of industrial power trucks have been placed on the list of those who make models which are approved by WPB and come within provisions of L-112. Limitations have been placed on specifications applied to fork-type models of power trucks, limiting the height of the lift and length of the forks on the trucks. (L-112-a)

WATER COOLERS: Production of special self-contained drinking water coolers for use aboard ship is permitted for an indefinite time. Originally the exception expired on July 6. (L-126)

BABY CARRIAGES: Production schedules for third quarter have been set at 289,622 baby carriages and 265,400 strollers, walkers, and sulkies compared with 289,369 and 233,500, respectively, for second quarter. Sitting vehicles require about one pound of metal per unit while carriages require from 6 to 9 pounds for single and 12 pounds or more for twin types. (L-152)

HEAT EXCHANGERS: Coverage of order L-172 has been broadened to include additional types and sizes of heat exchangers. The order makes a distinction between the most critical types and others by requiring specific authorization by WPB before an order can be placed with a manufacturer for certain heat exchangers. Applications for authorization to purchase Group 1 exchangers must be made on WPB-1475 (formerly PD-615). Orders for all other exchangers must bear preference rating of AA-5 or higher. (L-172)

STEEL FENCE POSTS: Number of styles has been reduced from about 75 to less than 20, resulting in an estimated saving of about 6000 tons of steel. (L-211)

STERILIZERS: Schedule A of order L-266 has been enlarged to include additional sizes of pressure sterilizers of the cylindrical, rectangular and water pressure types, and nonpressure sterilizers, which may be produced. Restrictions on use of critical metals in certain types of sterilizer equipment are eased. (L-266)

WELDING EQUIPMENT: A new order sets up procedure for establishing a national reserve pool of used idle resistance welding equipment which must be tapped first to meet demands before new equipment can be purchased. Owners must register with WPB on form WPB-2732 equipment which has not been used more than 120 hours during a period of 90 consecutive days. Manufacturers must report on WPB-2830 on or before 15th of each month all purchase orders for new and rebuilt equipment and repair parts unfilled, received and cancelled during the preceding month. Manufacturers and dealers are prohibited from accepting orders for delivery of any new equipment unless the order or delivery is specifically authorized on WPB-2752, except in cases of: purchase orders of $200 or less; orders for resistance welding electrodes; orders for equipment for direct use by Army, Navy, Maritime Commission, or War Shipping Administration; orders bearing preference ratings assigned under order P-19-h; or orders placed by manufacturers or dealers in resistance welding equipment. (L-298)

FOOD DEHYDRATORS: Production quotas have been assigned to 31 manufacturers of domestic food dehydrators in self-contained units. Initial production of 89,000 units plus parts must be completed by Sept. 1. (L-308)

P ORDERS

SEWERAGE FACILITIES: Order P-141 as revised covers only sanitary systems operated separately or combined with a storm sewerage system. Other sanitation services are covered by CMP regulation No. 5A. The order now assigns: preference rating of AA-1 to supplies for MRO, and lowest rating given to a rated project to construction of sewage facilities to serve such project, provided commencement of construction is authorized by WPB; prescribes: method for obtaining controlled materials in specified forms and shapes and a certification for use in applying the AA-1 rating and allotment symbol by an operator to deliveries of materials for use in MRO; provides that ratings assigned by the order may be extended by a supplier by use of the certificate prescribed in Priorities Regulation No. 3, and the ratings assigned to extensions of systems to serve rated projects may be applied by use of the certification prescribed in Priorities Regulation No. 3; establishes the year 1942 as the base year for determining MRO expenditures; provides that an operator whose cost for supplies in MRO in 1942 were $1000 or less and who anticipates that that amount will not be exceeded in the year under consideration is exempted from quarterly limita-

tions; provides for increase in expenditures for MRO proportional to increase in dry weather flow from year to year and also for expenditure for repairs in excess of ordinary allowances, following calamitous circumstances; cost of the $1500 and $500 limited extensions and expansions must be included with other expenses for MRO supplies; restrictions upon construction of extensions to serve customer premises have been eliminated from the order, provided that no iron or steel pipe is used by the operator except in minimum quantities required in making necessary connections. (P-141)

PRIORITIES REGULATIONS

FACSIMILES: Use of facsimile signatures on purchase or delivery orders wherever a signature is required by a WPB order or regulation is permissible. (PR No. 7)

PRICE REGULATIONS

COPPER SCRAP: Uniform limit to fees and charges made for conversion of copper and copper-alloy scrap in toll transactions has been established. The charges must not exceed the difference between the maximum price for scrap metal and ceiling price of refined copper. (No. 20)

MACHINERY: Effective period has been extended for provision in price regulation No. 136, permitting wholesalers to adjust their maximum prices on certain items, if they were based on lower manufacturer's prices than those in effect on Oct. 1, 1941. Effective July 23, a wholesaler is allowed to increase his base date (Oct. 1, 1941, for machines and parts listed in Appendix A and March 31, 1942, for those listed in Appendix B of the regulation) selling price by same percentage as the manufacturer increased the price to him. (No. 136)

Appointments-Resignations

Sidney J. Weinberg has resigned as assistant to chairman of the War Production Board.

* * *

Roy W. Johnson of Stamford, Conn., has been appointed deputy director of the Facilities Bureau, War Production Board. He succeeds Col. Gordon E. Textor who has returned to duty with the U. S. Corps of Engineers.

* * *

Richard O. Fischer of Chicago, has been appointed deputy director of Division of Railway Transport, Office of Defense Transportation.

* * *

John Downing has resigned as assistant director of the Marketing Division, Petroleum Administration for War.

* * *

Paul M. Green has been appointed director of the Accounting Division of the Office of Price Administration, succeeding Herbert F. Taggart who has accepted a major's commission in the Army.

* * *

James E. Pew has been appointed assistant director of the Division of Natural Gas and Natural Gasoline, Petroleum Administration for War. Mr. Pew succeeds Paul W. Raigorodsky who resigned on June 30. Succeeding Mr. Pew as chief of the Natural Gas section is Charles E. Webber.

Bureau of Planning and Statistics Combines Functions of Three Groups

FORMATION of a Bureau of Planning and Statistics, combining the functions of the former Division of Statistics, Planning committee, and Office of Progress Reports has been announced by Charles E. Wilson, executive vice chairman, War Production Board.

Stacy May remains director of the Division of Statistics and becomes director of the new bureau. Simon Kuznets, who has been acting chairman of the Planning committee, is associate director of the bureau and director of the new Planning Division. This division will appraise the overall production capacity of our economy, relating the flow of resources to military production with civilian and indirect military requirements.

M. Joseph Meehan, who has been director of the Office of Progress Reports, is director of the Progress Division, the functions of which remain unchanged.

Division of Statistics will have these three assistant directors: M. A. Copeland, in charge of Munitions Branch; E. B. George in charge of Materials Branch; and V. D. Reed in charge of Industry and Facilities Branch. R. W. Trunley, who was administrative Officer of the Division of Statistics, is administrative officer of the bureau.

Bureau of Planning and Statistics, which reports directly to vice chairman Donald D. Davis, will recommend plans and policies for effective mobilization of industrial resources and essential civilian production. It also will appraise the feasibility and balance of production objectives and effective implement of policy, and will compile statistics and other information relating to these tasks.

A specific duty of the bureau will be to compile a *Materials Handbook*, recording quarterly estimates of supply and demand for major industrial materials. It will prepare reports on changes in these estimates during the quarterly periods.

Reorganization of the WPB Lumber and Lumber Products Division also has been announced. J. Philip Boyd is the director and Mathias W. Niewenhous is deputy director. The division now consists of the following three branches: Program Branch with Henry Clopper as chief and Albert C. Cline as head of a Requirements Section. It also has a Statistical Section; Operations Branch with Harold E. Holman as acting chief; and Marketing Control Branch with J. N. Winton as chief.

War Production Drive Headquarters has announced extension of Labor-Management Production committees to 2100 war plants, employing 4,556,150 workers, through addition of 200 committees which have registered recently with Drive Headquarters.

WPB Appoints Industry Advisory Committees

Director of Industry Advisory Committees, War Production Board, announces formation of the following industry advisory committees:

Malleable Iron

Government presiding officer is George F. Hocker. Committee members are: C. S. Anderson, Belle City Malleable Iron Co., Racine, Wis.; L. A. Dibble, Eastern Malleable Iron Co., Naugatuck, Conn.; Charles A. Gutenkunst Jr., Milwaukee Malleable & Grey Iron Works, Milwaukee; A. F. Jackson, Michigan Malleable Iron Co., Detroit; W. H. Moriarty, National Malleable & Steel Castings Co., Cleveland; K. M. Smith, Lancaster Malleable & Steel Corp., Lancaster, N. Y.; John Wagner, Wagner Malleable Iron Co., Decatur, Ill.

Range Boiler and Tank

Government presiding officer is Vincent T. Manas. Committee members are: T. M. Bohen, Whitehead Metal Products Co. Inc., New York; M. H. Feldman, John Wood Mfg. Co., Chicago; K. P. Fuhrmann, Wheeling Steel Corp., Portsmouth, O.; R. E. James, Rheem Mfg. Co., Sparrows Point, Md.; Wesley Martin, A. O. Smith Corp., Milwaukee; E. Sedlachek, Scaife Co., Oakmont, Pa.; A. R. Hanson, L. O. Koven Inc., Jersey City, N. J.; D. D. Smith, Porcelain Steels Inc., Cleveland; O. S. Wessells, D. D. Wessells & Sons Co., Detroit.

Dump Body Hydraulic Hoist Manufacturers

Government presiding officer is John E. Graham. Committee members are: A. F. Brooker, Daybrook Hydraulic Corp., Bowling Green, O.; Harry Cobey, Perfection Steel Body Co., Galion, O.; Gerald S. Connelly, General Body & Hoist Co., Everett, Mass.; W. H. Hammond, Gar Wood Industries Inc., Detroit; B. J. Heiser, Galion Allsteel Body Co., Galion, O.; G. H. Herr, Marion Metal Products Co., Marion, O.; Richard R. Howard, Anthony Co. Inc., Streator, Ill.; E. P. Monroe, Hercules Steel Products Co., Galion, O.; W. S. Scruggs, St. Paul Hydraulic Hoist Co., Minneapolis; H. A. Stoller, Heil Co., Milwaukee.

Farm Machinery and Equipment Transportation

Government presiding officer is James W. Crofoot. Committee members: J. R. Dreffer, traffic manager, New Idea Inc., Coldwater, O.; F. L. Fisher, traffic manager, Starline Inc., Harvard, Ill.; M. L. Gibson, assistant traffic manager, International Harvester Co., Chicago; W. P. Mertsching, traffic manager, James Mfg. Co., Fort Atkinson, Wis.; H. J. Schroeder, general traffic manager, Deere & Co., Moline, Inc., and J. C. Shoemaker, traffic manager, Buckeye Incubator Co., Springfield, O.

Bearing and Bushing

Government presiding officer is R. L. Vaniman. Committee members: Frank I. Bowles, Kendrick Mfg. Co., Detroit; B. A. Brown, Moraine Products division, General Motors Corp., Dayton, O.; Ray F. Crom, McQuay-Norris Mfg. Co., Indianapolis; P. J. Flaherty, Johnson Bronze Co., New Castle, Pa.; H. O. Johnson, Bound Brook Oilless Bearing Co., Bound Brook, N. J.; A. J. Langhammer, Amplex division, Chrysler Corp., Detroit; James L. Meyers, Cleveland Graphite Bronze Co., Cleveland; David W. Rodger, Federal-Mogul Corp., Detroit; and L. G. Hooker, Detroit Aluminum & Brass Corp., Detroit.

Information supplied by an Industrial Publication

One of the best ways of expediting machining is the use of tools that make several cuts simultaneously. True, such tools must usually be specially designed, but the time saved more than compensates for the effort of developing them.

A tool developed to do three operations simultaneously on an aluminum die casting is a good example. It is a combination drill, miller and facing cutter.

The drill which cuts flash from the center hole is in the middle. It is surrounded by a four-tooth hollow mill which removes push-out pins at the bottom of the annular recess between the inner and outer walls. Above the mill, on a flange, are four cutters that remove flash and face the top edge of the casting.

All of these operations are performed with the tool in a drill press spindle, the work being held by a simple fixture. The time saving between this method, requiring a single set-up and a single stroke of the drill press spindle, and the use of three set-ups and three tools is obvious.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

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MOLY

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

New model automobiles always were long in "conversational" stage in prewar days and they again are becoming popular subjects for discussion. . . . "Inside" information is once more beginning to be passed around about new designs and plans

"CONVERSATIONAL" new models have been built by the automotive industry almost ever since it was considered an industry, and they are again becoming popular discussion subjects. In prewar days, there was always a new model just around the corner—a new $300 Ford, or a new streamlined Packard, or a Buick Torpedo, or a new light Nash. Some of them finally turned out to be the real thing, months and often years after they hit the conversational stage; others never did see the light of day, but nevertheless discussion of them was usually based on actual development work. Various reasons could be ascribed to their ultimate demise. Perhaps the sales department decided the market did not justify the cost. Perhaps bugs developed in an engine or in a frame or a body. Or perhaps the brass-hat department concluded to write off the development expense and start on something else.

Suppliers Were "In"

Suppliers of materials, parts and equipment to the motor industry were "in" on many of these new car projects. They had to be, in order to furnish estimates on new equipment lines, or new steel sections, or new castings. Discussion of new models was often the conversational stock-in-trade of these people. They could tell you all about a new light Ford, or a new line of streamline bodies which GM was developing, or a new Chrysler transmission, often long before the sponsors of such developments had actually decided to go ahead.

Obviously it is a long distance from the discussion of a proposed new model to its appearance on salesroom floors. Everyone in the industry is fully aware of this, but many of the general public are prone to believe that as soon as they hear about a new car model it is time to go out and place an order.

All this is prefatory to the point that the industry today is just about into the new model conversational stage. "Inside" information is once more beginning to be passed around Detroit about new model designs and plans. Some of this discussion is centered around specific builders, which is pretty certain proof that practically all units of the industry are finding some time to shape plans for automobile production once it can be resumed.

There is nothing particularly unpatriotic about this. After all, the design engineers and the stylists and the master mechanics are there on the job every day, and if war production has progressed to the point where they have some free time, what is more natural than to turn to new car model planning? Officially the motor companies will deny they have any concerted new model activity, but nevertheless there is plenty of unofficial work taking shape.

For example, creditable reports indicate Lincoln has put the finishing touches on ten hand-built jobs for postwar production. They resemble closely the last of the 1942 models the company built. The cars are said to be full-size models, of regulation materials, but of course did not come off production dies, since these are not available. Parts like fenders, hoods and body sections can be shaped over wood form blocks to sufficient accuracy for experiments.

Ford likewise is reported to be pushing new car design activity a little more strongly. An engineering group formerly busy on tank and aircraft engine development now is spending some time on the perfection of a 5-cylinder in-line engine for use in what appears to be a new Ford model in the low-price field. Many engineers will tell you the 5-cylinder engine is better balanced than either a four or a six to give smooth, vibrationless performance, and of course would show some economy over a six. There are no particular construction difficulties in such an engine, the crankshaft throws being spaced 72 degrees apart, and firing order 1-5-2-4-3.

Fragmentary reports on the car itself include such features as transverse double-action leaf springs, which permit removal of shock absorbers; tubular steel frame supporting a full-size 5-passenger body; two-speed transmission designed to permit the countershaft to be free in direct drive, thus contributing to economy.

Product of Continued Research

It should be emphasized that this development work is nothing which may have originated in the last four or five weeks, but is more likely a part of a continuing program of research and development on which a little added emphasis is being placed at the moment. It would likely take six months to a year from the word "go" to put such a proposed car in production. Meanwhile the regular Ford, Mercury and Lincoln lines would go back into production, although conceivably the 5-cylinder job could take the place of the Ford six which was more or less interchangeable in Ford chassis with the V-8.

As far as is known, the industry has never built a 5-cylinder engine, but for the past few years Mr. Ford and some of his engineers have been reported "intrigued" by its possibilities.

Experiments likewise are understood to be in progress on the adaptation of the Ford 12-cylinder aircraft engine to wing mounting in airplanes. This type of mounting calls for a flat pancake-type engine, enclosed by the airfoil and obviating the necessity for nacelles. To adapt a V-12 to such a mounting it would be necessary to "open up" the Vee sufficiently to make the front profile more nearly flat.

This is the type of engine which originally was scheduled to be built in the new plant of the Liquid-Cooled Engine Division of Aviation Corp. in Toledo, O., a project which was canceled by the WPB several months ago. The plant was well along toward production, but personnel has now been transferred to other divisions of the corporation,

THE WOMEN

One job in every three at Cadillac Division, General Motors Corp., is now performed by a woman, which is in sharp contrast to peacetime conditions when no women were employed in Cadillac plants. Even a year ago there were only 44 women employed in tank and aircraft engine work. From a modest start in inspection departments, women now are classified in nearly all types of jobs from sweepers to crane operators.

Speaking of women, Mrs. Bernice Palmer, Detroit, who nine months ago ran a confectionery store and who now works in the Packard Rolls-Royce plant has been deluged with 1700 suggestions for solving a production difficulty after her problem was pictured in a recent issue of a popular weekly magazine. However, a solution worked out by the Packard process department proved more practical than any of the 1700 diagrams, blueprints, descriptions and working models which Mrs. Palmer received.

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or has obtained positions with other manufacturers, and the operation now is scheduled to be taken over by Packard for production of certain components of the Rolls-Royce Merlin aircraft engine.

The latter deal has not been worked out to the complete satisfaction of Army, Navy, DPC and other interested parties, but it has progressed to the point where the name of a proposed plant manager is freely mentioned in equipment circles, although without any confirmation whatever from Packard.

Packard Expansion Moving Along

It will be recalled that a major expansion in production schedules for the Rolls-Royce was requested of Packard late last year and this is now well along toward accomplishment. The engine apparently has met high favor with both British and American air force officials and is being installed in additional types of planes. News reports only last week indicated the Rolls-Royce with new type supercharger was used in the North American P-51 Mustang in the Sicilian engagement, under the new Air Force designation of attack bomber, A-35. Normally the P-51 has carried an Allison engine.

Certain suppliers of aircraft engine parts report that a move is on foot to debit vendors for gasoline used in engine tests which develop faults in parts supplied by such vendors. In view of the enormous quantities of gasoline used in such test cell operations, this charge conceivably might be plenty high.

There is an interesting story behind the assumption of operations at a Grand Rapids, Mich., ex-furniture plant by the Saginaw Steering Gear Division of General Motors, where the new M30 carbine has been in production for the Army for the past four or five months. Originally this plant was set up as the Irwin-Pederson Co. with the idea of bringing an important new arms industry to Grand Rapids in answer to pleas by civic leaders and state officials. The Irwin family has been identified with the furniture industry of Grand Rapids for many years, and one of the plants owned by the family was cleaned out and retooled for carbine production. Pederson is an inventor and specialist in design of firearms who now operates the Pederson Arms Co. in New York. He was active in the development of the .30-caliber carbine which already has proved to be a welcome addition to U.S. weapons.

Tooling of the Grand Rapids plant was completed over a year ago and the company set about organizing its personnel and lining up material. But for some strange reason, after the passage of 12 months, there were still no carbines coming from the plant. Difficulty was said to have been principally one of management, but that is beside the point now. At any rate, army officers were considerably ruffled over the situation and decided to lay down the law, giving the plant 30 days to produce "or else." It proved to be the latter alternative, so Saginaw Steering Gear was asked to step into the situation. This division of GM has been producing .30-caliber machine guns in one of its Saginaw plants for several years and performed an exceptionally speedy task in assimilating this contract, along with three other GM divisions which had contracts for the .30 and .50-caliber Browning.

Within a few weeks, the Grand Rapids plant was in production and output has been rising steadily for the past four months. The incident is one of many examples of the difficulties the Army has experienced in converting a plant unfamiliar with metalworking operations and volume production technique to arms manufacture, and of the valuable assistance which automotive "know-how" has given to the war program. Doubtless there are other examples which could be cited of just the reverse situation.

In assuming operation of the plant there was considerable reshuffling of personnel, but Mr. Irwin is still active there in a purchasing capacity, and Mr. Pederson spends some of his time with his New York connection and also in development work on an entirely new type of infantry gun, some preliminary work on the latter being handled by a Detroit engineering firm.

Foundries Use Substitutes With Cereal Binders Short

War production in thousands of foundries has not yet been curtailed by shortage of cereal binders. Many shops are successfully utilizing certain substitutes.

These substitutes vary, depending on type of foundry and availability of material. Substitutes include: Dextrine; synthetic resins, by-product of the sulphite paper process known as lignin, soybean meal and rosin base binders.

Requisitioning of the 90 mid-western terminal elevators' corn stocks by the War Food Administration has enabled corn refiners to keep plants operating. WFA officials can supply refiners with enough corn to keep plants open until the end of July. Between eight and ten million bushels of corn are now either at the plants or on the way.

However, stretching out this supply until the end of the month will mean cutting out less essential products.

SEALING TANKS: These tanks are being readied before loading on flat cars at Ford's Richmond, Calif., plant. This is a general view showing women sealing the tanks shortly before shipment

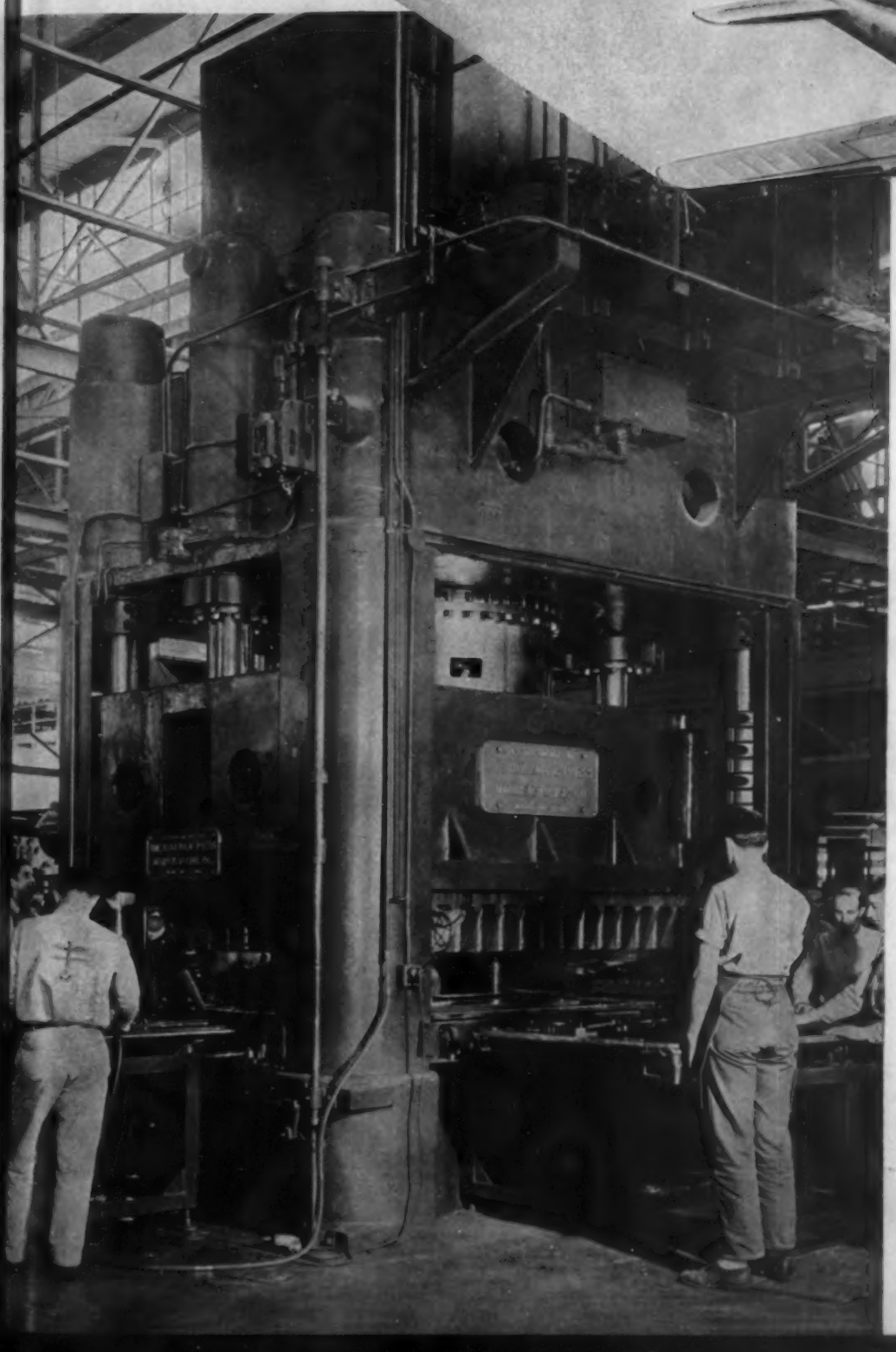
Kaiser's Fontana Plant Reporting New Records

Production records at Kaiser Co. Inc., Fontana, Calif., are being broken. The blast furnace delivered 1236 tons on July 2 though it is only rated at 1200 tons. Four 150-ton open hearths made 1710 tons on July 6—just 140 tons short of the combined rated daily capacity of the 6-furnace shop.

Electric Steel Plant on Coast Boosts Operations

Melt shop of the Oregon Electric Steel Rolling Mills, Portland, Oreg., now is in operation on two shifts; the third shift will be added within the next three weeks when the 9-inch merchant mill starts rolling.

HPM FASTRAVERSE PRESSES are responsible for the mass production of Boeing Bombers



This H-P-M FASTRAVERSE rubber pad forming press is one of many H-P-M presses turning out thousands of formed metal parts for Boeing bombers and trainers. Final victory depends on the continuous operation of these presses. There is no time for shut-downs! That's why H-P-M designs and builds the hydraulic pumps for generating pressure to operate H-P-M presses. There's no chance for undivided responsibility! When you buy an H-P-M FASTRAVERSE press, you buy guaranteed press performance.

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WING TIPS

Little mention made of new military plane models. . . In heavy bomber field two superplanes are reported nearing production. . . . Lockheed's tieup with Pacific Finance seen as step to facilitate postwar financing of private plane sales

RECENT Office of War Information report on American air transport (STEEL, June 21, 74) mentions nothing, of course, about new military plane models nearing production. In the heavy bomber field, for example, are two superplanes on which the most rigid censorship has been clamped by the Army Air Forces. However, as usual, this restriction seems to have been partially broken by mention of the planes in British publications, and in the June 11 issue of the *United States News* they were mentioned specifically as the B-29, successor to the Boeing B-17 Flying Fortress, and the B-32, successor to Consolidated B-24 Liberator.

Two comparatively new medium (two-engine) bombers are the Vega Ventura, PV-1, now being supplied to the Navy, and a new Douglas attack bomber. Greater emphasis appears to be in process on the two-motor bomber by both Army and Navy, with some easing up on dive bomber types.

Lockheed Aircraft Corp., Burbank, Calif., announces purchase of the majority interest in Pacific Finance Corp. of California, reportedly to facilitate the sale of private planes when the war ends, but more likely to help finance the sales of certain types of consumer goods other than airplanes which Lockheed may be manufacturing come peace. Lockheed obtained control of Pacific Finance by purchasing the holdings of Transamerica Corp. and associates, involving 381,205 shares of stock valued at $15.25 per share, or a total investment by Lockheed after retirement by Pacific Finance of common shares, of $3,750,000.

Transamerica Corp. is a holding company tied in closely with the Bank of America, probably the largest West Coast banking interest, founded by the Gianini family in San Francisco. Bank of America and Transamerica Corp. have extensive industrial holdings, including the Enterprise Engine & Foundry Co. of San Francisco, and General Metals Corp. of Oakland and Los Angeles, both at new production peaks by virtue of war contracts. Bank of America also handles finances of the Henry J. Kaiser interests which spread nearly the full length of the West Coast and are continually expanding. There is considerable talk of actual financial connection between Kaiser and Bank of America, but this is denied by sources close to some of the Kaiser interests.

Speaking of the acquisition of Pacific Finance, Robert E. Gross, Lockheed president, offered the rather vague statement that, "While all our efforts and facilities currently are dedicated to building airplanes to help win the war, we must look forward to the day when our industry will have new responsibilities to the nation's society and economy." That could mean a lot of things.

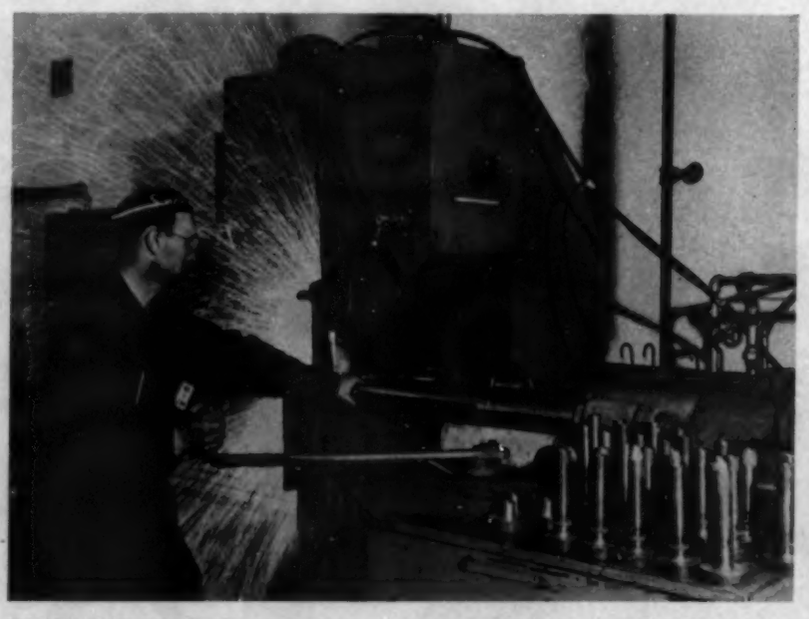
Set Aside Postwar Fund

This much is known. Lockheed's gross sales for 1942, including wholly-owned subsidiaries, totaled just short of half billion dollars—$491,160,470.87 to be exact. This represented a three-fold increase over 1941 and was eleven times that of 1940. Indicated net income after taxes and provision for the corporation's offer to reduce prices to the government under uncompleted renegotiation of certain contracts, was $8,163,721.38, or $7.59 per share. Reserves for contingencies and postwar adjustments of $3,500,000 were set aside both in 1941 and in 1942, plus $2,000,000 in 1942 for "possible obsolescence of inventories." As of December, 1942, all bank indebtedness had been liquidated, but since that time a $90,000,000 V-loan has been arranged with a group of banks.

Former Fleetwings Inc., Bristol, Pa., specialist in the production of stainless steel trainer planes, is now known as the Fleetwings Division of Kaiser Cargo Inc., following the purchase of the company by the Kaiser interests. Ira S. Wilson, vice president of Fleetwings, and active with the company since 1940, has been transferred to Brewster Aeronautical Corp., Long Island city, N. Y., to serve as vice president. The latter company also is operated now by Kaiser interests, reportedly having been taken over at the instigation of the Navy Department which was dissatisfied with production progress there. Frank de Ganahl is vice president and general manager of Fleetwings.

What looks to be an economical and efficient method for preventing the waste of good rivets—always a headache in an aircraft plant—has been put to test recently by Fleetwings. The plan is simple, centering around the packaging of rivets in small cellophane bags. Analysis shows a saving in dollars to the tune of four to one on heat-treated rivets and 10 to 1 on non-heat-treated rivets by the use of the bagging method.

About 2 ounces of rivets are put in each bag and the container then is indelibly marked, crimped and heat sealed. Riveters obtain their supplies from racks in which the bags have been placed according to size, type, etc. As needed,



FLASH WELDING: Forged steel caps are welded on tubes for piston assemblies at the Long Beach, Calif., plant of Douglas Aircraft Co. Inc. Welding machine uses 60,000 pounds hydraulic pressure on the piece at the upset. Special transformer supplies power, with current setting of 5.1 volts and 37,700 secondary amperes. Flashing time is about 9 seconds, with upset travel 3/16-inch, total travel ½-inch and closed dies 5/16-inch apart

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the rivets are removed from the bags and the open ends of the bag are twisted to seal them again.

Another important advantage is that heat-treated rivets do not harden as quickly when bagged. The cold air emanating from the bagged rivets keeps them soft much longer than in conventional practice. A further definite economy is possible by means of using an automatic bagging machine which measures a predetermined weight of rivets into each bag and seals them mechanically.

A typical test conducted by Fleetwings on non-heat-treated rivets, bagged versus unbagged, shows the following:

Unbagged rivets	Pounds
Weight of useful rivets in surfaces	48.5
Weight of rivets from sweepings	16.5
Weight of mixed rivets from benches	17.4
Total rivet demand during period of test	82.4
Weight of rivets lost through damage	0.75
Time to sort sweepings and bench collections	40.6 hours
Cost of screening	$ 3.00
Cost of sorting	30.42
Cost of damaged rivets @ $1 per pound	.75
Cost of reclamation and damages per pound of useful rivets	0.709
Bagged rivets	**Pounds**
Weight of rivets used	42.8
Weight of rivets returned	1.35
Weight of rivets to be sorted	0.094
Weight of useful rivets	41.45
Time required to bag and seal	1.8 hours
Cost of bagging and sealing	$2.70
Cost of sorting bagged rivets	0.084
Cost of bagging and sorting per pound of useful rivets	0.0672

These tabulations show a margin of 10 to 1 in favor of the bagged rivets, considering only the relation between cost of reclamation and damages per pound used on the one hand and the cost of bagging and sorting per pound used on the other. Not included, but probably an important factor, is the relation between the bagged and unbagged rivets with respect to handling time.

Comparison of Rockwell hardness and length of time before rivets reach non-driving hardness gives an edge to the bagged rivets of around 87 minutes.

FAREWELL TO "OLD BOOMERANG": Through an unfinished fuselage section of the giant Lockheed Constellation, four-engine transport now going into volume production at Burbank, Calif., is seen the last of the famous Lockheed Hudson two-engine bombers to be built. Richard A. Von Hake, Lockheed vice president in charge of manufacturing (right), looks on as the final "Old Boomerang" rolls by, marking the end of an era in American aviation. The Hudson's role as a medium attack and reconnaissance bomber has been taken over by newer and faster aircraft, and the manufacturing and assembly space released is being turned over to the building of the Constellation, and to doubling production of the Lockheed P-38 two-engine fighter. The Hudson was in production steadily from January, 1939, to June, 1943, and hundreds of them are now in battle service on all six continents of the world

New Aviation Company

One of the new aviation companies on the West Coast about which virtually nothing has been heard is Avion Inc., said to have been organized by Richard W. Millar, banker, who not so many years ago was brought into the presidency of Vultee by the Aviation Corp. and who left this post around the time the Consolidated-Vultee merger was first discussed. Millar has hired a number of top-notch aviation engineers from other companies in the southern California area and has set up operations in a Los Angeles plant. Just what he is doing few people on the Coast seem to know, beyond the fact that he and his staff are "developing a new plane."

AiResearch Mfg. Co. at El Segundo near Los Angeles, designer and builder of such accessories as exhaust heat exchangers, automatic exit flap controls, intercoolers, elliptical oil coolers and supercharger aftercooling systems, comes in for considerable comment in West Coast manufacturing circles because of the fact it has employed deaf mutes so successfully. It is reported 30 per cent of the company's personnel is of this incapacitated class.

Some of the Lockheed-Vega "feeder" and small branch plants have had strange beginnings for plants now supplying aircraft assemblies and parts. One was formerly an ice rink, a second a bowling alley, a third a national guard hall, a fourth a flour mill, a fifth an automobile distributor headquarters, and a sixth a whisky distillery.

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ONE OF A SERIES OF SUGGESTIONS TO AID PRODUCTION

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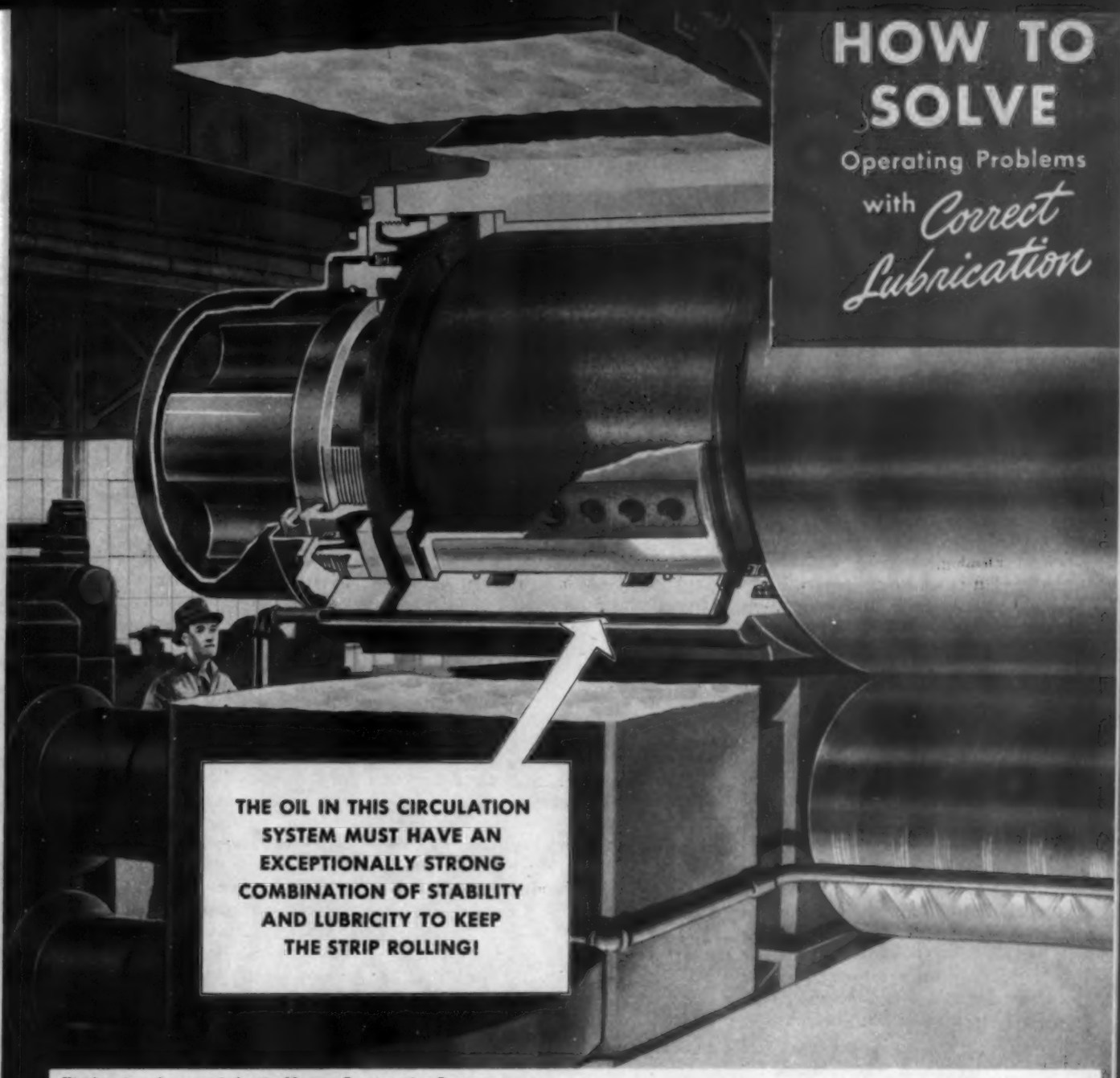
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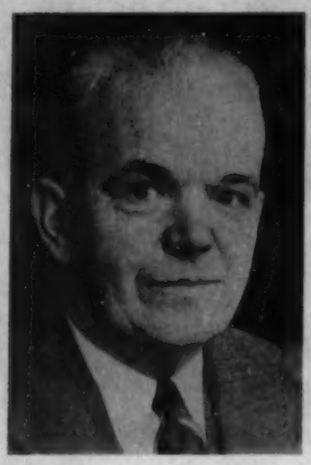

P. M. FLEMING

WALLACE W. LEIPNER

R. K. BOWDEN

DAVE M. WHYTE

P. M. Fleming, vice president in charge of sales, Pittsburgh Rolls Division, Blaw-Knox Co., Pittsburgh, has been given the added responsibility of vice president in charge of operations. **Ralph H. Scholl,** former sales engineer, has been appointed sales manager; **S. Clifford Elms,** previously chief engineer, has been named general superintendent; and **W. H. White,** formerly general superintendent, has been appointed metallurgical engineer in charge of research and new developments.

—o—

Lieut. Col. G. G. Blackstock recently was elected executive vice president of Steep Rock Iron Mines Ltd., Toronto, Ont.

—o—

J. W. Peckham has been appointed manager of the development and design engineering department, Bristol Co., Waterbury, Conn. Mr. Peckham joined the Bristol radio engineering department in 1922, and in 1940 he was made Pacific Coast district manager. **E. Nuber** succeeds Mr. Peckham as manager of the Pacific Coast branch offices and factory with headquarters in San Francisco.

RUSSELL B. GUNIA

Who has been appointed manager, stainless steel bureau, metallurgical division, Carnegie-Illinois Steel Corp., Pittsburgh, as reported in STEEL, *July 12, p. 86.*

—o—

Wallace W. Leipner has been appointed acting chief engineer, American Welding & Mfg. Co., Warren, O. Mr. Leipner has been associated with the company since 1941 as assistant to the vice president in charge of engineering. He is a member of the National Society of Professional Engineers and also of the American Society of Military Engineers. **Verne Wildman,** previously general foreman of American Welding's machining department, has been appointed assistant superintendent.

—o—

W. K. Page has resigned as vice president and general manager of Addressograph-Multigraph Corp., Cleveland, to become associated with the Wassell Organization of Westport, Conn.

—o—

In the July 12 issue, captions labeling the pictures of **J. L. Mullin** and **W. F. Kelly** of American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill., were inadvertently misplaced. The photograph presented as that of Mr. Kelly was that of Mr. Mullin, and vice versa.

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E. A. Koether has been named technical assistant to **Allen W. Morton,** vice president and general manager, American Hammered Piston Ring Division, Koppers Co., Baltimore. **Edgar S. Freeman Jr.,** former assistant sales manager, succeeds Mr. Koether as works manager of the division.

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Henry H. Howard, previously manager, engine sales department, Caterpillar Tractor Co., Peoria, Ill., has returned to the company as general sales manager after temporary emergency service with the United States Ordnance Department, Detroit. **J. Q. McDonald,** acting general sales manager since May, 1942, is now free to devote full time to his duties as export manager of the company. **H. W. Smith,** former assistant manager, engine sales department, has been made manager of that department.

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R. K. Bowden, former manager of the Chicago district metallurgical department, Carnegie-Illinois Steel Corp., Pittsburgh, has been appointed director of the quality control, research and technology department, Pittsburgh. **L. J. Rohl,** assistant manager of the metallurgical department in the Chicago district since 1939, succeeds Mr. Bowden as manager. **F. A. Wickerham** has been appointed staff assistant, department of research and technology, Pittsburgh. **Howard J. Eyman** has been named assistant to the company's chief metallurgical engineer, succeeding Mr. Wickerham. **Howard L. Dawson,** previously chief engineer, Pittsburgh district, has been appointed assistant chief engineer of the company to succeed the late L. C. Edgar. **Charles H. Williams,** former assistant to vice president in charge of engineering, United States Steel Corp. of Delaware, Pittsburgh, has been named to succeed Mr. Dawson as chief engineer of the Pittsburgh district.

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Dave M. Whyte, foundry expert, Cooper-Bessemer Corp., has been appointed supervisor in charge of casting sales for the corporation's two foundries located at Mt. Vernon, O., and Grove City, Pa.

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Albert S. Glossbrenner, former superintendent, Brier Hill Works, Youngstown Sheet & Tube Co., Youngstown, O., has been appointed general superintendent of the Youngstown district, succeeding **J. L. Mauthe,** who has become vice president in charge of operations, as announced in STEEL, July 5, **Buford M.**

E. S. MOORHEAD

WILLIAM J. McMILLEN

Stubblefield, formerly superintendent of the coke plant and blast furnaces at the Campbell works in Youngstown, succeeds Mr. Glossbrenner as superintendent of the Brier Hill works.

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E. S. Moorhead, organizer and director of the steel tubing division, Iron and Steel Branch, War Production Board, has resigned to become general manager of the Steel Tube Division, Talon Inc., Oil City, Pa.

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S. H. Mortensen, chief engineer of the electrical department, Allis-Chalmers Mfg. Co., Milwaukee, has been elected a national director of the American Institute of Electrical Engineers for a term of four years beginning Aug. 1.

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William J. McMillen, since 1939 assistant manager of roll sales, Mackintosh-Hemphill Co., Pittsburgh, has been appointed manager of production and manufacturing. Mr. McMillen has been associated with the company 26 years.

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Fred T. Whiting, manager of Westinghouse Electric & Mfg. Co.'s Northwestern district, and **Charles L. Dostal,** Pacific Coast district manager, have been appointed vice presidents. Mr. Whiting's headquarters are in Chicago, Mr. Dostal's in San Francisco. **Roy V. Gavert,** former manager of the Canton Ordnance division for Westinghouse, has been appointed headquarters staff superintendent of the district manufacturing and repair department, East Pittsburgh, Pa.

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John W. Thompson, for the past four years Cleveland district representative, Carpenter Steel Co., Reading, Pa., has been appointed assistant manager of alloy steels sales with headquarters in Reading.

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Marcello A. King has joined Worthington Pump & Machinery Corp., Moore Steam Turbine Division, Wellsville, N. Y., as executive engineer, taking charge of design, research, testing, and service.

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Richard H. Hughes has joined Almquist Brothers & Viets, Los Angeles, as manager of the abrasive division.

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Frank H. Buckingham has been named president of the Sandusky Foundry & Machine Co., Sandusky, O., succeeding **Devereux Lake,** resigned.

—o—

Fred W. Fraley has been appointed vice president and sales director, Diamond Alkali Co., Pittsburgh.

OBITUARIES . . .

Edward F. Kenney, 74, metallurgical engineer on the staff of the vice president of operations, Bethlehem Steel Co., Bethlehem, Pa., died July 8 in Media, Pa. Mr. Kenney was widely known throughout the steel industry, with which he had been associated since 1907. He was past president of the American Steel Manufacturers Association, which was later absorbed by the American Iron and Steel Institute, and was a senior member of several committees of the American Society for Testing Materials. Mr. Kenney had also served as a member of the Technical Advisory Committee, WPB.

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Samuel Reid Russell, 63, senior technician, explosive department, E. I. du Pont de Nemours & Co., Wilmington, Del., died in Easton, Pa., July 8.

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Gustave F. Williams, president, Williams Mfg. Co., Cleveland, died July 3 in Columbus, O.

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Erwin H. Geiger, 47, president, Surrey Motors Corp., Long Island city, N. Y., died July 7 in that city. Formerly president of General Bronze Corp., Long Island city, N. Y., Mr. Geiger left that company in 1936 to devote full time to Surrey Motors.

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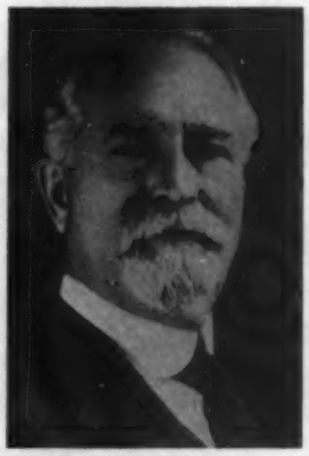
Charles H. Wilkinson, 61, president, Logansport Machine Co., Logansport, Ind., died July 13 in Cleveland.



JAMES E. MacMURRAY

Who was founder and president for 38 years of Acme Steel Co., Chicago, died July 1 in South Pasadena, Calif., as announced in STEEL, July 12, p. 87.

John Henry Dumbelton, 52, technical adviser and purchasing agent for the maritime division, A. B. C. Steel Equipment Co. Inc., New York, died July 4.

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Forrest A. Kelly, construction production co-ordinator, Republic Steel Corp., Cleveland, died June 26.

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H. William Peyser, 31, manager, sales-correspondence department, Carbide & Carbon Chemicals Corp., New York, died July 3 in Brooklyn, N. Y.

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C. J. Qualter, general manager, gear department, Meisel Press Mfg. Co., Boston, died recently.

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Forrest Gains Hamrick, 63, comptroller, American Smelting & Refining Co., New York, died July 9 in Ridgewood, N. J.

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Henry J. Mollenberg, 75, president, Mollenberg-Betz Machine Co., Buffalo, died July 11 in that city.

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Hugo C. Wagner, 70, department manager, Simmons Co., Kenosha, Wis., died July 4 in Evanston, Ill.

Possibilities for the Future Limitless, Industrialist Holds

Chairman of Monsanto Chemical Co. in new book maintains present visions are but the promises of great adventures which lure modern pioneers. . . Says private enterprise more likely to further progress than collectivism

THAT the possibilities of the future are so limitless only one forecast can be made with certainty—that the most extravagant prophecy will fall short of potential accomplishments, is the hope which Edgar M. Queeny, chairman Monsanto Chemical Co. St. Louis, holds forth for the postwar world in a book, "The Spirit of Enterprise," just released by Scribner's Sons, New York.

Denying that our economy has reached maturity and that our chief problem is to learn to live with our new and unmanageable riches, Mr. Queeny maintains "we are rich in material things only by comparison with other nations and with the past."

The day may come, he predicts when workers will travel a hundred miles from country homes to offices and factories by helicopter bus with no greater expenditure of time and money than is required for a bus-ride through five miles of city traffic today.

"Business believes that pre-fabricated houses of the future will be warmed by sunlike, healthful, penetrating radiant heat from tiny wires buried within walls. They will be air-conditioned for summer comfort, illuminated by cool, germicidal light, and equipped with built-in, low-temperature refrigeration to keep food fresh for months, even years."

"But these and many hundred other visions," he points out, "are but promises of great adventure which lure modern pioneers. That we have reached maturity is a conclusion of pessimism."

It is Mr. Queeny's conclusion that the people, expressing their desires in the market place, are much more likely to stimulate further progress toward the material and spiritual gains he deems possible than any state-planned, state-controlled production system.

While he votes unhesitatingly for free enterprise as opposed to a state planned and directed economy, and while he marshals an imposing array of historical and contemporary data to support his choice, he does not find business faultless.

"Business men," he says, "should be willing to accept more of the classic conception of the free enterprise system. Business should recognize the justice of much well-deserved, although misdirected, criticism by new dealers. Business men should correct the causes of the antipathy to their ways that has arisen in such profound and superb intellects as that of the archbishop of Canterbury. They should be willing to have all conditions necessary to a free market restored, and to provide the people with the full advantage of competition.

National Incorporation Law

Among the specific suggestions Mr. Queeny offers for the immediate future are a national incorporation law which would strengthen existing antitrust laws by prohibiting interlocking directorates, mergers between competitors and the ownership of stock by one business in another. Business, he suggests, must also give up "the special privileges it now enjoys in the way of excessive tariffs against nations with an equivalent standard of living and be reconciled to a reduction of those against low standard nations as fast as it can be accomplished without disrupting our economy."

To be effective, however, he points out that these progressive moves by business must be matched by an equally enlightened attitude on the part of government. By applying Hatch act principles to pressure groups, he suggests that Congress might destroy the disproportionately swollen power of vociferous minorities. By substituting regulatory laws for government of business by capricious and unpredictable boards and commissions, Congress could free business from crippling uncertainty at the same time it continued to protect the people from business excesses.

As another necessary measure, he suggests that taxes should be reconsidered on the basis of what kind and what rates will produce over the long pull the greatest potential revenue needed for normal operating expenses of government and liquidation of the national debt, thus forestalling the inflationary threat of continued deficit financing and freeing capital markets for the tremendous job of reconstruction and new industrial expansion which lies ahead.

He warns it is not necessary to socialize our economy through central economic planning in order to provide adequately for the so-called lower third. On the contrary, by encouraging free enterprise, we encourage the technological progress which brought us to our present peak and which promises even greater gains for the future. By absorbing a part, or even all, of the savings of technological progress through a progressively-increasing manufacturer's excise tax, we could finance a much more ambitious and extensive social program than any redistribution of our present wealth, and we could do this without raising average prices to the public or reducing incentives to capital, labor or management.

Nation Needs More Employers!

Economist declares their birth and survival rate should be made higher in treatise on postwar readjustments in which question is raised whether labor has not overpriced itself in terms of full employment

EXPERIENCE during the 20's and 30's indicate that there must be some wage for labor at which greater quantities of it can be absorbed into productive employment than at any other, states Dr. Emerson P. Schmidt, economist of the Committee on Economic Policy, Chamber of Commerce of the United States, in another notable pamphlet, No. 5 in the series entitled "Postwar Readjustments."

In the pamphlet Dr. Schmidt discusses problems that will be involved in the postwar absorption of our total labor supply, and in it he raises the question as to whether labor has not overpriced itself in terms of full employment.

Figures for the 30's, he says, are particularly significant. Figuring 1929 on a basis of 100, both wholesale and retail prices had dropped to 81 by 1939; at the same time hourly wage rates had risen to 122. The popular assumption that high hourly wages mean greater purchasing power fails to take into consideration that high hourly wages also mean higher production costs.

Higher production costs forced manufacturers all through the 30's to seek ways and means of increasing productivity per

worker in order to be able to sell its goods or services at prices that met competition and which consumers would pay. The continual demand of labor for higher pay thus was a leading factor in bringing about more unemployment.

Just as a good example, Dr. Schmidt includes figures showing that for every 100 people employed by the railroads in 1923 only 55 were on railroad payrolls in 1940. While the railroads have had a good record in the field of labor relations, as Dr. Schmidt points out, relative freedom from strikes has been purchased at the price of many jobs of railroad men.

On the other hand, Dr. Schmidt states, more thought should be given to "real" rather than hourly wages. In 1908 rubber workers were being paid an average of 40 cents an hour on tires costing $35 that would run an average of 2000 miles; he shows that an hour's pay to the rubber worker would have enabled him to drive a car six miles, counting only the factor of tire wear. In 1936 the rubber worker received 88 cents an hour, a gain of 120 per cent. However, a number of other things had happened. The tire cost $8, it could run 20,000 miles. The wage of a rubber worker in 1936 was sufficient to drive his car 2200 miles as far as tires were concerned. Higher quality at lower prices, declared Dr. Schmidt, must always be far more important in the standard of living of the American people than the number of counters (dollars) they get.

In other words, by continually driving for higher wages labor may be killing the goose that lays the golden eggs, and if labor continues to ignore this fact it is going to eliminate the possibility of having full employment after the war.

Another threat is that continued demands for higher wage rates in those industries that are more profitable at any time, and in insisting upon bonuses and other financial benefits to the workers involved, will invite trouble.

It should be clearly understood, Dr. Schmidt states, that wage rates in any one industry should not depend upon productivity and profits in that particular industry. Rather, the increase in output should be shared by all consumers, which automatically would include all labor rather than some labor. In other words, we need a new concept of "collective bargaining" if we are to avoid vast unemployment at some time in the postwar period.

It is necessary that we re-learn the simplest definition on an employer: An employer is a person who provides employment. In the 30's when we had a dire shortage of employment offers and a surplus of would-be employes, we tried to correct the unbalance by making the position of the employe more attractive and that of the employer less attractive.

"Then we wonder why there are not more employment opportunities! We need more employers. The way to get them is to make their birth and survival rate higher," says Dr. Schmidt.

While social gains may be desirable, and while no one wants to set the clock back, in our enthusiasm for reform and change we must exercise much greater care in the future than we have in the past.

"Instead of making it tougher for an employer to put and keep men on his payroll," concludes Dr. Schmidt, "we must make it easier and more attractive for him; otherwise all this talk about jobs for all is a species of self-deception or, at best, a gross deception of labor itself. No one has any right to trifle with the welfare of labor."

Copies of the pamphlet may be had by writing to the Chamber of Commerce of the United States, Washington.

REHABILITATION

Restoration of economic and political structures of war-torn countries of Europe and Pacific areas as they are removed from Axis domination to provide huge demand for labor and materials of all kinds

VAST amount of employment will be furnished in relieving and rehabilitating war-torn countries of Europe and in the Pacific area as they are removed from Axis domination, according to Herbert H. Lehman, director, Foreign Relief and Rehabilitation Operations, and former governor of New York, in recent speeches.

So gigantic is the problem that a draft agreement, already signed by China, the Soviet Union, the United Kingdom and the United States, has been placed by the Department of State before the 43 governments of all the United Nations and the other nations associated with us in this war. The principle is that of "equitable sharing." The needs are so large that no one nation, nor any limited number of nations, could supply them without draining off raw material supplies to an undue extent.

Initial needs in supplying relief will include such items as food, medicine, clothing and other essential supplies. Then must follow assistance needed for purposes of rehabilitation, seeds, fertilizer, farm animals and many other items. Railroads, bridges, highways, port facilities, telephone and telegraph lines must be repaired. Water supply and sanitation must be restored. Farm and factory equipment will have to be furnished. The morale of Axis controlled peoples must be re-established and they must be enabled to achieve and maintain a high degree of prosperity.

"Prosperity in this country helps other people to be prosperous and prosperity elsewhere helps us to be prosperous," Governor Lehman says. "I would like to suggest that prosperity, like peace, is indivisible. After the war the peoples of this world will either go forward on the road to progress together or they will go to economic ruin together."

He quotes from Henry J. Kaiser, West Coast industrialist: "Let it be said again that there will never be any significant prosperity in America as long as there are great hosts of people living on the margins of prosperity anywhere on earth."

As the war approaches its climax, and in the immediate postwar era, says former Governor Lehman, machine tool builders, shipbuilders, and many other industries will be able to continue in existence and provide employment by producing one or another of the many items that will come under the general head of foreign relief and rehabilitation.

In other words, such relief and rehabilitation is impelled not only by considerations of decency and humanity, but it is good business. By rebuilding the foreign countries and creating better customers for many of the products in which, because of our inventive and productive genius, we are pre-eminent in the world, we will have less to worry about in connection with our own economy. Instead of playing "Santa Claus" as many critics have charged, expenditures that come under the head of foreign relief and rehabilitation will prove a profitable investment in the long run, he says.

Tow Bridge Solves Launching Problem

"WHACKY" PROPOSAL PRACTICAL

Unique span erected over dredged channel from inland shipyard permits passage of newly launched tankers with minimum interruption of highway traffic. . . Bridge is economical to operate and can be easily moved from anchorage

AMERICA'S war production ingenuity is no more in evidence than at the Odenbach Shipbuilding Co. yards in Greece, N. Y., a few miles outside of Rochester, where engineering achievements aren't restricted solely to novel techniques in turning out oil tankers for the Transportation Corps, Army Service Forces.

The mere fact that the shipways are operating is indicative of the ingenuity that is being translated into striking power through production. For the Odenbach yards were constructed inland on a farm site, about 1800 feet from Lake Ontario a year ago. Sufficient lakefront property was at a premium; couldn't be obtained, in fact. But the problem of launching tankers was solved neatly and with dispatch.

The farm abutted Round pond, which extended near the shipways and some distance to the lake. Engineers dredged the pond and provided an exit route for the ships which are being launched today at the rate of one every 12 days. Yet still another problem presented itself. Edgemere drive carried across the newly dredged exit channel. This called for construction of a bridge—and a different type of bridge—one that could be put in place in a hurry; would be economical in cost and operation and easily moved from its anchorage when necessary.

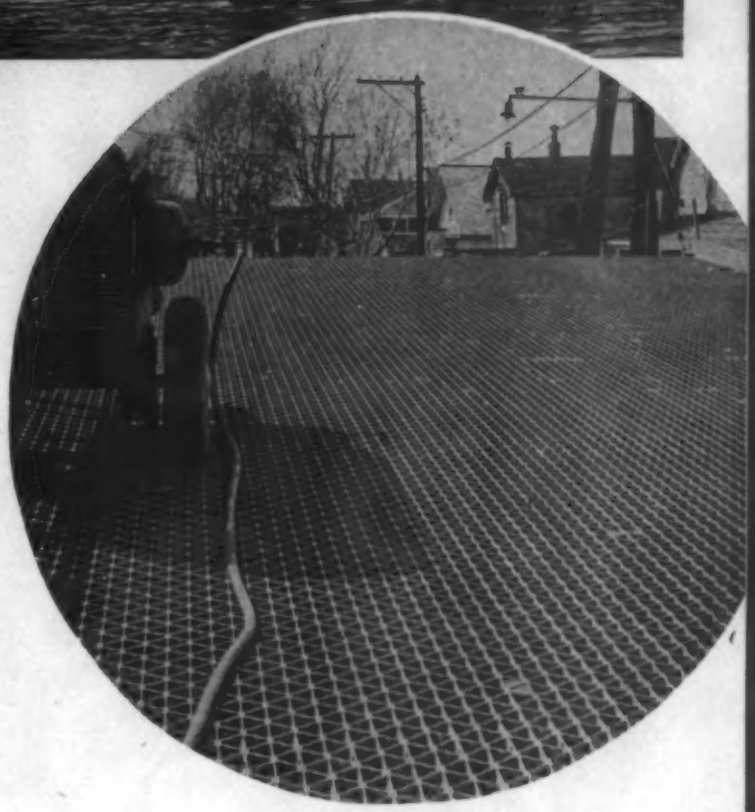
Odenbach engineers went into a huddle, conceived what seemed a "whacky" yet practical idea. Maybe it was crazy, they conceded, but they were from Missouri and had to be shown. So they called in "outside" advice.

Engineers of the Irving Subway Grating Co. were consulted. "Not so crazy," was the comment from these experts. Odenbach and Irving engineers rolled up their sleeves and went to work.

What is described as one of America's most unusual bridges resulted!

It is a "pontoon tow" span, 65 feet long and 22 feet wide, with four lifting pontoons, one under each corner, and four outrigger pontoons for added stability. The bridge is surfaced with standard open-mesh steel decking 2½ inches deep, which saves an estimated 50 tons in weight over corresponding

Just off the ways this Army tanker sails past "pontoon tow" bridge which has been towed aside by a crew of two men. Lightweight bridge is surfaced with open-mesh steel decking



Left—Inland yard of Odenbach Shipbuilding Corp. necessitated dredging of a canal to Lake Ontario and construction of "pontoon" tow bridge. Span is shown being swung by guy ropes to allow passage of newly launched tankers

Above—"Pontoon tow" bridge is an open-deck steel span which can be swung easily aside to allow passage of tankers when they are launched from the inland ways. Here bridge is shown being raised and guy ropes are being attached to slip span from mooring

Right—Closeup of two-lane open-mesh steel surface "pontoon tow" bridge. Machine at left is portable air compressor which pumps air into four lifting pontoons and raises span above roadway level

concrete surfacing. Total weight of the span is 75 tons, with 15-ton capacity and two-way continuous traffic.

Lifting pontoons are each 25 feet by 10 feet by 6 feet deep, with the outriggers 5 feet by 6 feet by 7 feet. The bridge, which is about 200 feet back from the lakefront, rests on a continuous concrete sill. When a boat is ready for its shake-down run on Lake Ontario, it is towed down the channel to the pontoon bridge. Here a portable air compressor mounted on a truck pumps pressured air into the lift pontoons, which empty out the water. The span then raises several feet above a roadway level and is ready for the tow-lines.

The bridge is then swung by a team of two men from the roadway about 50 feet and sidled into a specially-dredged bay. Before this bridge "hangar" was hacked out of the channel, the floating span was towed out into Lake Ontario while newly launched tankers made their proud exit down the channel. Now, however, the entire procedure is expedited by simply swinging the bridge aside. Entire process of inflating the pontoons with compressed air and slipping the bridge from anchorage consumes 20 minutes or less.

Odenbach engineers say the bridge is a complete success and offers a practical answer for any problem of the kind where mobility is required only occasionally and where economy and construction speed are prime considerations.

The span utilizes a 90 cubic-foot portable compressor. Lifting capacity is approximately 120 tons.

Credited With "Firsts"

The Odenbach company is credited with many notable "firsts." Most recently, it won praise for its technique of using channel irons for hull construction, rather than conventional steel plates. This allows for 90 per cent prefabrication before going down the ways. In addition, the tankers are 80 per cent welded. Boats are built in 6 sections —3 cargo tank sections, bow section, engine room section and after-peak section. Workers put through the complete hull in only 11 working days.

Before the war, the Odenbach company built large tankers with three million gallons average capacity. Now, however, the yard is concentrating on medium-sized tankers, 180 feet long, with a 30-foot beam and a 13-foot molded depth. Two diesel engines propel the twin-screw craft which are designed for ocean travel. They can carry 288,000 gallons of gasoline.

Guiding genius of the shipyard is John H. Odenbach, of Rochester, who invented the steel channel system of construction, which is under study for possible use in other Army yards.

In 1931, when Mr. Odenbach entered the shipbuilding business, his yards turned out the largest all-welded ship of any kind—a combination tanker and freighter 212 feet long with a 30-foot beam.

Coal Conference Stresses Output

Mine operators, equipment men, government officials meet to study means of restoring peak production

REMOVAL of all obstacles standing in the way of maximum production of coal for war and intensified co-operation within the industry during a most crucial period in its history are favored topics as members of the American Mining Congress meet July 19 at the Netherland Plaza, Cincinnati, for a two-day coal mine war conference.

In order that the meeting of mining executives, government officials and equipment manufacturers might be confined strictly to discussions of industry-wide difficulties, exhibits were ruled out.

The conference program highlights the manpower problem by giving it first place in the opening sessions on Monday.

Technological advances, improvement in mining, handling and preparation technique and conservation of men and materials were to be covered by speakers addressing the four deep and strip mining sessions.

A special meeting was arranged for Tuesday morning to give coal company purchasing agents and their staffs the chance to discuss buying problems and procedures with A. S. Knoizen, director, War Production Board Mining Equipment Division. An open meeting was to be held Tuesday afternoon for mining equipment manufacturers to gain a better understanding of allotments, equipment scheduling and other matters pertaining to their field from WPB officials.

George F. Campbell, vice president, Old Ben Coal Corp., national chairman of the congress, is general chairman of the meeting and leader of the opening session. R. L. Ireland, Jr., president, Hanna Coal Co., Cleveland, will preside at the luncheon meeting on Monday which will feature a talk on the military situation. Practical topics bearing more directly on problems of the coal industry were to be discussed by speakers addressing the luncheon session on Tuesday. The speakers and their subjects:

Howard I. Young, director, Mineral Resources Co-ordinating Division, War Production Board, on "Assisting the Mines To Maintain Full Production"; T. J. Thomas, director of production for coal mine operations, Department of the Interior, on "Coal for War"; Arthur S. Knoizen, director, Mining Equipment Division, WPB, on "Machinery and Equipment for Coal Mining." George E. Stringfellow, vice president, Thomas A. Edison, Inc., incoming chairman, manufacturers division, American Mining Congress, will preside.

Carl E. Newton, Deputy Federal Coal Mine Administrator, and Hon. James V. Forrestal, Undersecretary of the Navy, will be guest speakers at the annual dinner on Tuesday evening. Irvin Davis, president, Hatfield Campbell Creek Coal Co., was toastmaster.

UTILITY BUILDING

New type of galvanized steel semicircular building, 40 feet wide by 100 feet long, is being built in great numbers in foreign theaters of war to be used for purposes ranging from recreation centers to machine and repair shops.

Exclusive of the time required for laying a concrete floor, the structure can be erected in about 300 manhours. The arched ribs are made of strip steel. Ribs are manufactured in sections and can be laid on the ground and bolted together. Construction crews are able to raise the ribs by merely pulling them into place with a rope.

The corrugated steel cover is camouflaged. Each unit weighs approximately 25,000 pounds and can be packed into crates occupying only 369 cubic feet of space.

New Officers Announced By Controllers Institute

W. H. Dupka, controller of the Jones & Laughlin Steel Corp., has been elected a vice president of the Pittsburgh Control of the Controllers Institute of America. J. H. Carson, controller and assistant treasurer of the Pittsburgh Coke & Iron Co., was elected secretary.

E. A. Berry, treasurer of the Koppers Co.; R. C. Markle, controller of the Carnegie-Illinois Steel Corp.; M. M. Schratz, auditor of the Aluminum Co. of America; R. E. Hanley, secretary and treasurer of the Allegheny Ludlum Steel Corp., and Rolf Griem, assistant controller of the A. M. Byers Co., were chosen directors.

James W. Flynn, assistant secretary and treasurer of the Sheffield Steel Corp., has been elected vice president of the Kansas City Control.

Walter H. Winter, assistant secretary and assistant treasurer of the Symington-Gould Corp., was re-elected secretary of the Buffalo Control.

Maynard F. Carter of the Worcester Pressed Steel Co., Worcester, Mass., has been re-elected a director of the Boston Control.

C. V. Burns, assistant treasurer of the American Zinc, Lead & Smelting Co., was re-elected a director of the St. Louis Control.

Kenneth B. Coates, assistant treasurer of the Great Lakes Steel Corp., and Vernard D. Hanna, secretary-treasurer of the Wolverine Tube Co., have been re-elected directors of the Detroit Control.

Michael J. Caden, controller of the Rustless Iron & Steel Corp., has been elected a director of the Baltimore Control.

James H. Barrett, secretary-treasurer of the Murray Corp. of America, Detroit; Richard L. Brummage, controller of the Tubular Alloy Steel Corp., Gary, Ind.; Phillip Donham, secretary and treasurer of the Electro Refractories & Alloys Corp.; Stanley E. Lebrocq, controller of the Steel Co. of Canada, Ltd., Hamilton, Ont.; John H. Nagle, assistant treasurer of the Muehlhausen Spring Corp., Logansport, Ind., and French Peterson, controller of the Kelly O'Leary Steel Works, Chicago, have been elected to membership in the institute.

Plans Being Prepared for Annual Chemical Meeting

"Catalysis of War Chemistry" will be the central theme of hundreds of papers and addresses to be presented before the 106th meeting of the American Chemical Society in Pittsburgh, Sept. 6 to 10.

Advances in wartime research will be reported at scientific sessions. "Manpower" will be the subject of a three-day symposium at which industrial leaders will discuss measures to overcome shortages of trained scientific workers.

CONVENTION CALENDAR

American Chemical Society, annual meeting, Minneapolis, Sept. 6-10. Dr. Charles L. Parsons, secretary, 1155—16th street N.W., Washington.

Association of Iron and Steel Engineers, semiannual meeting, three to four days starting Sept. 28, Hotel William Penn, Pittsburgh.

Electrochemical Society Inc., annual convention, New York, Oct. 13-14-15 and 16. Secretary, Dr. Colin G. Fink, Columbia University, New York.

American Institute of Mechanical Engineers, regional meeting; Iron and Steel Institute of Metals Divisions, A.I.M.E. Hotel Sherman, Chicago, Oct. 16-19.

American Society for Metals, twenty-fifth national metal congress, Palmer House, Chicago, Oct. 18-22.

American Welding Society, twenty-fourth annual meeting, Oct. 18-21, Hotel Morrison, Chicago.

Work Progressing on Two Stacks Under Construction in Texas

Lone Star state to resume her place among pig iron producing states after lapse of many years when new furnaces at Houston and Daingerfield are blown in some time during fourth quarter

CONSTRUCTION of the two Texas blast furnaces—the 274,000-ton stack of the Sheffield Steel Corp. at Houston, and the 432,000-ton unit of the Lone Star Steel Corp. at Daingerfield—is going forward and both are slated to go into operation during the fourth quarter.

Thus Texas again will take her place, after a lapse of many years, among the pig iron producing states of the union. Product of the Houston stack will be charged into the Sheffield Steel Corp.'s open-hearth furnaces, to be rolled subsequently in this company's finishing mills.

Pig iron to be made at Daingerfield will be available to other consumers.

The Lone Star Steel Corp. contemplates an open hearth and rolling mill program but such construction has not been authorized by the War Production Board.

At Daingerfield iron ore from the so-called North Basin, in Cass, Marion, Morris and Upshur counties, will be used exclusively. The ore occurs in green sand beds under an overburden of loose sand and soil approximately four feet deep, so that open pit mining methods may be employed.

The ore comprises an oxidized layer of limonite which averages 12 feet in depth. Underlying it, starting close to the water level, is a layer of siderite of varying depth. A sufficient quantity of this ore to last the Daingerfield stack for many years is located a few miles from the plant site.

To use the ore an elaborate system of beneficiation must be employed, including crushing, washing and concentration. The ores are high in silica and alumina. Each type requires individual treatment. In the case of siderite carbonic acid will have to be driven off by roasting. Both classes will be roasted or calcined and the fines of both will be sintered. Flowsheets for the preparation of these ores have been completed as a result of research, excepting that further details will have to be worked out to utilize the high silica middlings and thus permit higher recovery and bring down overall costs. The calcined limonite ore will average 51 per cent iron content, while the calcined siderite will average around 56 per cent. Silica will run around 11 per cent and phosphorus 0.08 per cent.

Ores from Cass County

At Houston the Sheffield Steel Corp. plans to use iron ore from Cass county in the North Basin and from Cherokee county in the so-called South Basin. In the South Basin the ore is a layer of limonite about 2½ feet deep and having little or no overburden. As far as now is known there is no siderite in commercial quantities.

The problem of beneficiation in the case of the ore going to Houston is not quite as difficult as will be necessary at Daingerfield.

Sheffield Steel Corp. does not at present contemplate the use of siderite. The limonite ore is to be crushed and washed. Calcining is not contemplated. With a mixture of ores from the North and South basins, the burden for the Houston furnace, on a 50-50 basis, will contain 45 to 46 per cent iron, 11 per cent silica and about 0.2 per cent phosphorus. A rail haul ranging from around 50 to some 200 miles is involved in getting the ore to the Houston site.

While the final cost of the ore delivered to the furnaces is not known exactly, the indications are that the unit cost of the contained iron will be lower than that in the case of lake ore delivered to Pittsburgh district furnaces.

The Sheffield management also contemplates the use of Mexican magnetite containing 63 per cent iron, 3 per cent silica and 0.60 per cent phosphorus. While it would bring up the phosphorus content it would reduce the silica in the charge. This ore would be hauled some 1000 miles from the Cerro de Mercado, the famous "iron mountain" in the state of Durango. Continuous delivery of this ore may not be possible during the war period because of car shortages.

Both the Daingerfield and Houston plants are equipped with batteries of by-product coke ovens. They will operate on coal of metallurgical quality from three mines in the state of Oklahoma which are scheduled to deliver a total of 2800 tons of coal daily to the two plants.

They Say:

"Certainly this Congress is no rubber-stamp Congress. Co-operating with the President on every war question, Congress has differed with him on almost every domestic policy."—**Senator Taft** of Ohio, addressing Alabama Bar Association.

• • •

"The spirit of co-operation and unity in industrial America accounts in large measure for the tremendous advances in production. We have all worked together; we have sacrificed together; we have resolved differences around the council table and the ration boards in behalf of an all-out effort. And we have not held back or delayed in constructive action."—**John R. Steelman,** director, United States Conciliation Service.

• • •

"Through some lack of foresight or vision manufacturers have permitted the public to get conceptions of postwar products which are impossible of attainment in the immediate postwar period."—**Lawrence Valenstein,** president, Grey Advertising Agency, New York.

• • •

"It is probable that immediately following peace and possibly even before then there will come from the railroads of the country a demand, so insistent that compliance with it will be imperative, for new equipment by way of rolling stock to replace that destroyed or worn out by reason of the heavy continuous service given by the roads during these years of national emergency."—**Charles J. Hardy,** president, American Car & Foundry Co.

• • •

"Through efforts on the home front, together with those on the battlefield, we have the enemy staggering. But like a winning prize fighter, we shouldn't give the enemy a breather, but continue our onslaught until he is completely out."—**Dr. William P. Edmunds,** Cleveland area director, War Manpower Commission.

Rolling Process Conserves Steel

American Rolling Mill develops new method of rolling propeller blade steel; saves critical metal

METHOD of rolling airplane propeller blade steel so that two blades may be made from the same amount of critical material that previously made one was revealed recently at the annual shareholders' meeting of the American Rolling Mill Co., Middletown, O.

Charles R. Hook, president of the firm, described the rolling process developed by the company. The process saves large quantities of critical materials and reduces machining time of the finished propeller by more than half, it was said.

Achievements of the steel industry, which has increased ingot capacity by 15,000,000 tons since 1940 and currently is producing at the rate of 90,000,000 tons in 1943, were cited. This has been done, Mr. Hook said, in the face of serious raw material handicaps and widespread labor disturbances throughout the industry.

Stockholders were told that the recent stoppage in the nation's coal mines, which impaired steelmaking facilities generally, had not interrupted production in the company's plants because an ample stock of coal was on hand.

James B. Doan, J. Frank Drake, R. L. Gray, and Charles R. Hook were re-elected directors for a three year term.

NAM Issues Booklet With 70 Morale Posters

National Association of Manufacturers recently issued to its 9000 members a "Posters-For-Production" booklet containing reproductions of 70 morale-building posters chosen as representative of the war effort.

Posters were chosen from approximately 1000 submitted by 700 companies and were judged by three non-members of the association.

Interlake Chemical Corp. Formed in Delaware

Interlake Chemical Corp., a new company to be owned jointly by Interlake Iron Corp., Chicago, and Great Lakes Steel Corp., Detroit, has been incorporated in Delaware with authorized capital of $5,000,000.

The chemical corporation was organized for the purpose of processing chemicals recovered from distillation of coal in by-product coke ovens. The Interlake Iron Corp.'s Chicago tar distillation plant, which has been in operation for the past three years and its tar acid and naphthalene plant now under construction in Chicago, have been sold to the new corporation.

Officers of the Interlake Chemical Corp. are George R. Fink, chairman of the board; Leigh Willard, president; Earl Doig and J. A. Mitchell, vice presidents, and J. R. Alderman, secretary and treasurer. Directors are Mr. Fink, George Humphrey, Mr. Doig, Severance A. Millikin, Mr. Mitchell, and Mr. Willard.

Develops New System To Feed Workers on Job

A new system for feeding war workers on the job, thus avoiding congestion in cafeterias, has been developed by Mealpack Inc., New York city.

Hot and cold foods, packed side by side to form a complete meal, can now be served up to five hours after packing in the container produced by the company. The container consists of five earthenware food and beverage compartments insulated within durable finished pressed steel.

A menu for pre-ordering the following day's meal is enclosed and the entire container sealed for delivery to the workers on the job. A seal-lock prevents tampering with the containers and also carries the worker's shop number to permit easy identification.

When unsealed the top lid of the container becomes a comfortable tray. Distribution methods from the kitchen to the worker vary with the size and nature of the operations. Time lost getting to and from the food lines in cafeterias and lunch rooms is saved by delivering the food directly to workers.

For the duration the containers are available only for use in essential war plants.

OFF TO WAR

More than 7200 employes of the Birmingham district plants, mines and mills of the United States Steel Corp. subsidiary companies are serving in the armed forces, according to officials of the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Of the 7200 serving on land and sea, more than 7000 are from Bessemer, Ensley and Fairfield operations, and from various mines, quarries and office staff of the Tennessee company. Virginia Bridge Co.'s Birmingham plant has relinquished 135 employes to the armed forces and Universal Atlas Cement Co.'s Leeds plant lost 22 to the services.

BRIEFS . . .

Cooper-Bessemer Corp., Mt. Vernon, O., has extended its line of marine engines and is now producing diesels for propulsion and auxiliary power in salvage vessels of the United States and British navies.

—o—

Jessop Steel Co., Washington, Pa., announces organization of a new technical sales staff composed of the following specialists: John R. Harbaugh, metallurgical sales engineer; H. E. Doughty, assistant general sales manager; R. P. J. McCarty, eastern stainless steel representative; W. E. Wilson, mid-western stainless steel representative; John Walker, composite steel representative, and E. H. Dau, sheet and plate representative.

—o—

Iron and Steel Division, War Production Board, is staging an elaborate "Steel for Victory" exhibit at the main entrance to its offices in the Social Security building, Washington.

—o—

Mack Trucks Inc., Long Island, N. Y., has been producing high-precision and high-strain parts for the Republic Thunderbolt, P-47, during the past year.

—o—

Curtiss-Wright Corp., New York city, is producing the troop transport plane, C-46, in western New York plants of its airplane division, G. W. Vaughan, president, announced. The C-46 will be built in another factory in Missouri soon.

—o—

Sam Tour & Co. Inc. since July 1 has been operating the metallurgical laboratories of Lucius Pitkin Inc., 45 Fulton street, New York city. Sam Tour & Co. Inc., with main offices at 65 Pine street, specializes in metallurgical, chemical and process engineering. Lucius Pitkin Inc. continues as analysts, assayers, chemists, consultants, spectroscopists, weighers, samplers, and shippers representatives.

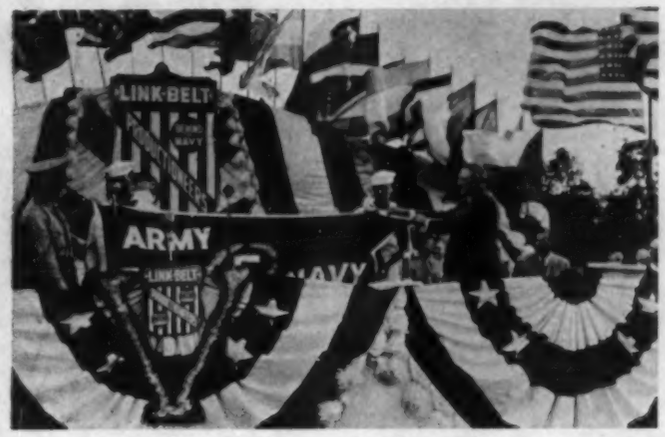
—o—

H. G. Irwin Lumber Co., Garland, Pa., has discontinued the use of the trade names "Durock" and "Silveroc" for the duration of the war. They will, however, continue to manufacture hammer boards under the trade name of "Grade A" hammer boards.

—o—

Universal Atlas Cement Co., United States Steel Corp., subsidiary, announces operation of its new cement plant at Northampton, Pa., has begun.

Presentation of the Army-Navy "E" pennant (right) was made by Col. Thomas G. Lanphier (center) to E. C. Clarke, president, Chambersburg Engineering Co., Chambersburg, Pa., on June 25. Merle Beam, employe representative (right), received "E" pins on behalf of employes



Link-Belt Co., Indianapolis, plant was awarded (left) the Army-Navy "E" flag. Frank S. O'Neil, president, accepts the flag from Col. F. W. McMahon (left)

C. Donald Dallas, president (below), Revere Copper & Brass Inc., accepted the Army-Navy "E" award for the company and the 1875 employes of the Baltimore division at a recent ceremony

Metalworking Companies Cited by Armed Services

Outstanding performances on war contracts won the joint Army-Navy "E" awards for the following companies recently:

Ace Mfg. Corp., Philadelphia.
Amana Society, Refrigeration Division, Amana, Iowa.
American Finishing Co., Memphis, Tenn.
American Smelting & Refining Co., Garfield, Utah.
Automotive Maintenance Machinery Co., Chicago.
Brighton-Advance Corp., Brighton, Mich.
Cannon-Kocka Co., Cleveland.
Cincinnati Gear Co., Cincinnati.
Crosse & Blackwell Co., Baltimore.
Detroit Gasket & Mfg. Co., Detroit.
Diamond Calk & Horseshoe Co., Duluth.
Eugene Dietzgen Co., Chicago.
E. I. du Pont de Nemours & Co. Inc., Du Pont, Wash., and Pryor, Okla.
Eastern Rolling Mills, Baltimore.
General Electric Co., Pittsfield, Mass.
General Instrument Corp., Elizabeth, N. J.
General Machine Co., Newark, N. J.
Hammond Iron Works, Warren, Pa.
Heintz & Kaufman Ltd., San Francisco.
Heywood-Wakefield Co., Gardner, Mass.
Jacobs Mfg. Co., West Hartford, Conn.
Remington-Rand Inc., Illiopolis, Ill.
United States Bronze Powder Works Inc, Closter, N. J.
United States Pipe & Foundry Co., Birmingham, Ala.
Atlas Powder Co., Reynolds, Pa.
Baker Mfg. Co., Springfield, Ill.
Bastian-Blessing Co., Chicago.
Carborundum Co., Niagara Falls, N. Y.
Dow Chemical Co., Pittsburg, Calif.
Fay & Scott, Dexter, Me.

THE BUSINESS TREND

Labor Problems Press for Solution as Output Slips

TREND of industrial activity is again slightly lower as the latest weekly indicators reflect some letdown in heavy goods production due to unstable conditions. Fluctuation in the steelmaking rate, slight contraction from the peak of electric power output, failure of coal operations to rebound following the back-to-work order and product design changes are conspicuous causes, but the labor situation—absenteeism, replacement difficulties and growing strike threats—is the major deterrent.

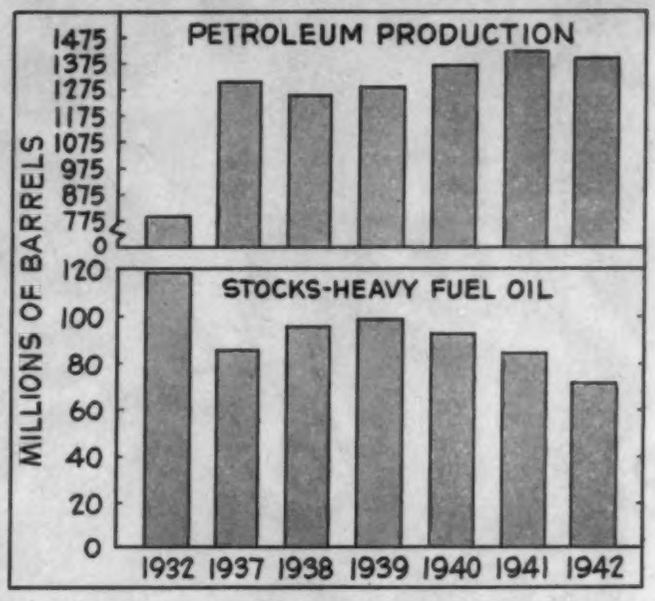
STEEL—Dwindling coal supplies again last week hampered steel production in the Pittsburgh district and other neighboring steel centers. This followed recovery of 5 points in the ingot rate to 97 per cent during the preceding week. Hit hardest by miner absenteeism were captive mines of steel companies, particularly those in western Pennsylvania, where activity last mid-week was only 30 to 50 per cent of normal.

CONSTRUCTION—More than 1000 new war plants, or $11 billion worth of a total of $14 billion authorized, are either in operation or near the operation stage. Changes in the overall war requirements picture indicate some properties will not be used for the purposes originally intended, but will be diverted to other work.

Interesting sidelight on the decline in building volume is the perceptible reduction in costs and greater efficiency of construction crews. Job competition, restored by the release of less experienced men to other war industries, is said to be increasing the efficiency of those remaining.

RAILROADS—Carriers have moved into the strongest cash position in history, an Interstate Commerce Commission compilation discloses. At the end of April they held $2,346,270,000 in cash or negotiable securities, over 1¼ billions more than a year ago. Net income of the 136 Class I railroads for the first four months of the year totaled $292,350,973, an increase of $144,303,516 over corresponding 1942 period.

RENEGOTIATION—One aim of the House of Representatives subcommittee studying the contract renegotiation program is to enact into law common standards not contained in present law to guide government departments as a basis in renegotiating war contracts. Congressional investigators are convinced there is no need to amend the law to allow creation of postwar reconversion reserves.



PETROLEUM—Reduction by the year-end of crude oil inventories above ground to the lowest point in 20 years is foreseen. This development is expected to provide ample reason for relaxation of restrictions on drilling of new wells, possibly higher prices for crude oil through upward revision of unprofitable price ceilings.

High military sources have expressed concern over future supply for domestic war purposes as well as for fighting machines abroad. Requirements of the services, exclusive of aviation fuels and lubricants, are about 1,000,000 barrels a day including Navy and lend-lease supplies. This is about 30 per cent of total demand. It is known that at least half of the cargo space for U. S. foreign shipments is occupied by petroleum products.

Most new well completions have been disappointing from the standpoint of volume, and drilling, which dropped off sharply in 1942, has continued to decline in 1943. Production of crude petroleum during the first five months of this year fell 300,000 barrels a day below government quotas.

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	97.0	92.0	96.5	97.5
Electric Power Distributed (million kilowatt hours)	3,919	4,111	3,926	3,424
Bituminous Coal Production (daily av.—1000 tons)	1,758	767	508	2,034
Petroleum Production (daily av.—1000 bbls.)	4,090	4,008	3,989	3,657
Construction Volume (ENR—unit $1,000,000)	42.0	60.1	69.6	401.6
Automobile and Truck Output (Ward's, number)	19,435	18,645	19,065	22,980

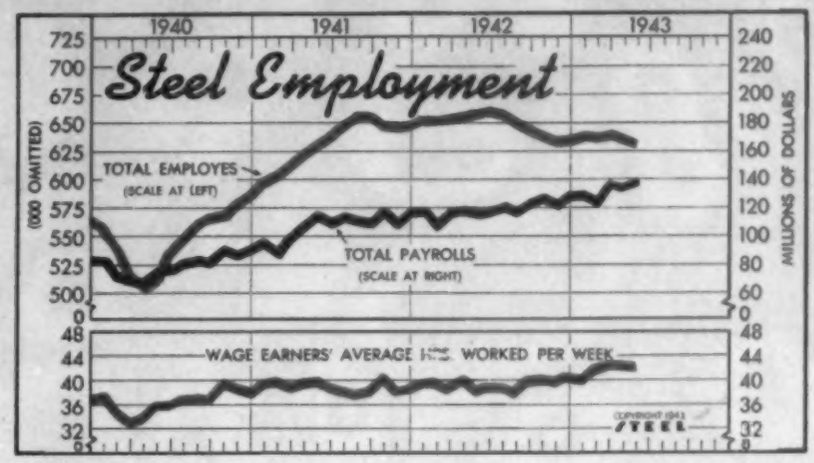
*Dates on request. Lag of one week.

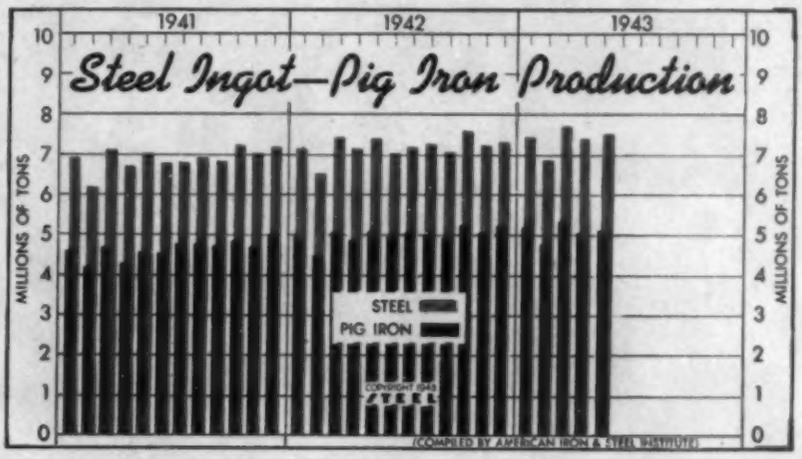
TRADE				
Freight Car Loadings (unit—1000 cars)†	809†	852	854	754
Business Failures (Dun & Bradstreet, number)	33	66	54	159
Money in Circulation (in millions of dollars)	$17,607	$17,420	$17,237	$12,489
Retail Sales (change from like week year ago)	+17%	+12%	+15%	+27%††

††Six Months. †Preliminary.

Steel Employment

	Employes—Number (000 omitted)		Total Payrolls (Unit—$1,000,000)	
	1943	1942	1943	1942
Jan.	637	651	129.7	118.8
Feb.	635	651	122.8	108.5
Mar.	637	653	136.8	117.0
Apr.	634	654	133.3	118.5
May	632	656	137.4	117.4
June	...	659	...	118.0
July	...	655	...	120.7
Aug.	...	647	...	118.7
Sept.	...	641	...	124.8
Oct.	...	635	...	126.6
Nov.	...	632	...	122.8
Dec.	...	633	...	129.3





Iron, Steel Production

(Net tons—000 omitted)

	Steel Ingots		Pig Iron	
	1943	1942	1943	1942
Jan.	7,424	7,112	5,194	4,983
Feb.	6,826	6,512	4,766	4,500
Mar.	7,670	7,392	5,314	5,055
Apr.	7,374	7,122	5,035	4,896
May	7,545	7,382	5,178	5,073
June	7,027	7,015	...	4,935
July	...	7,148	...	5,051
Aug.	...	7,233	...	5,009
Sept.	...	7,067	...	4,937
Oct.	...	7,584	...	5,236
Nov.	...	7,184	...	5,083
Dec.	...	7,303	...	5,201
Total	...	86,061	...	59,959

Foreign Trade
Bureau of Foreign and Domestic Commerce

(Unit Value—$1,000,000)

	Exports			Imports		
	1943	1942	1941	1943	1942	1941
Jan.	698	479	325	228	253	229
Feb.	679	478	303	234	253	234
Mar.	931	611	357	248	272	268
Apr.	1,136	695	385	266	234	287
May	...	525	385	...	191	297
June	...	618	330	...	215	279
July	...	627	359	...	214	278
Aug.	...	694	455	...	184	282
Sept.	...	718	417	...	196	263
Oct.	...	776	666	...	199	304
Nov.	...	750	492	...	174	280
Dec.	...	853	651	...	356	344
Total	....	7826	5126	....	2743	3345

FINANCE

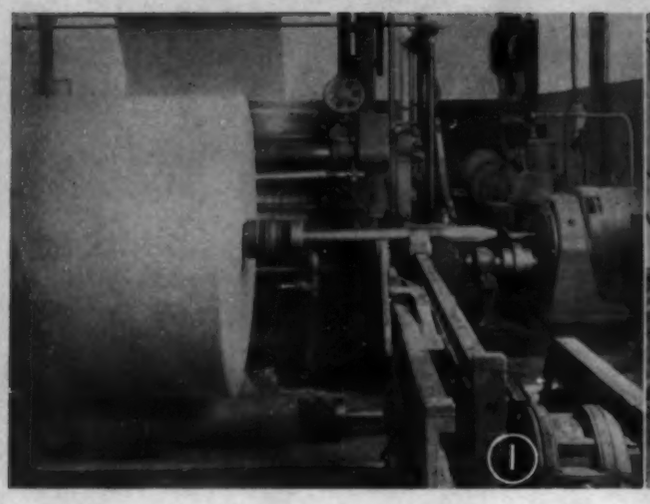
	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet, total in millions)	$7,558	$8,503	$8,123	$6,407
Federal Gross Debt (in billions of dollars)	141.3	140.7	140.4	77.9
Bond Volume, NYSE (millions of dollars)	52.0	64.0	53.2	29.0
Stock Sales, NYSE (thousands of shares)	4,163	5,279	5,263	2,763
Loans and Investments (in millions)†	$45,843	$46,147	$47,182	$32,382
United States Gov't. Obligations Held†	31,414	31,753	32,467	16,200

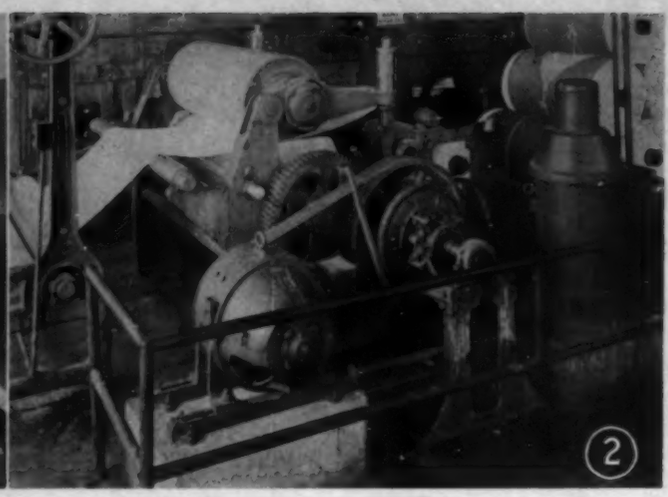
†Member banks, Federal Reserve System.

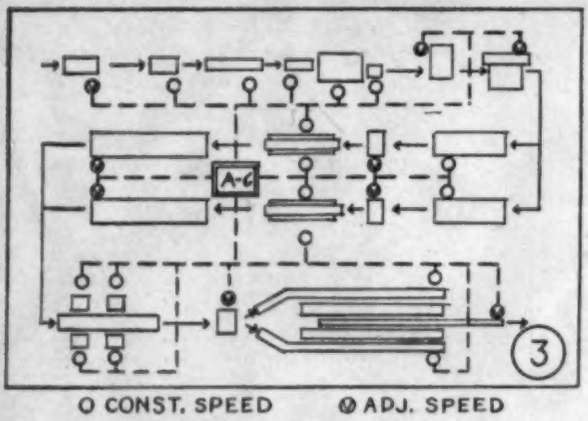
PRICES

STEEL's composite finished steel price average	$56.73	$56.73	$56.73	$56.73
Spot Commodity Index (Moody's, 15 items)†	243.1	245.4	245.3	233.4
Industrial Raw Materials (Bureau of Labor index)‡	114.0	114.2	114.1	99.9
Manufactured Products (Bureau of Labor index)‡	99.7	99.7	100.9	98.9

†1931 = 100; Friday series. ‡1926 = 100.







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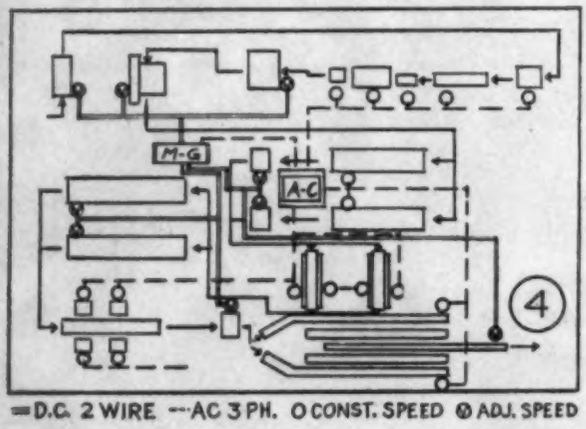

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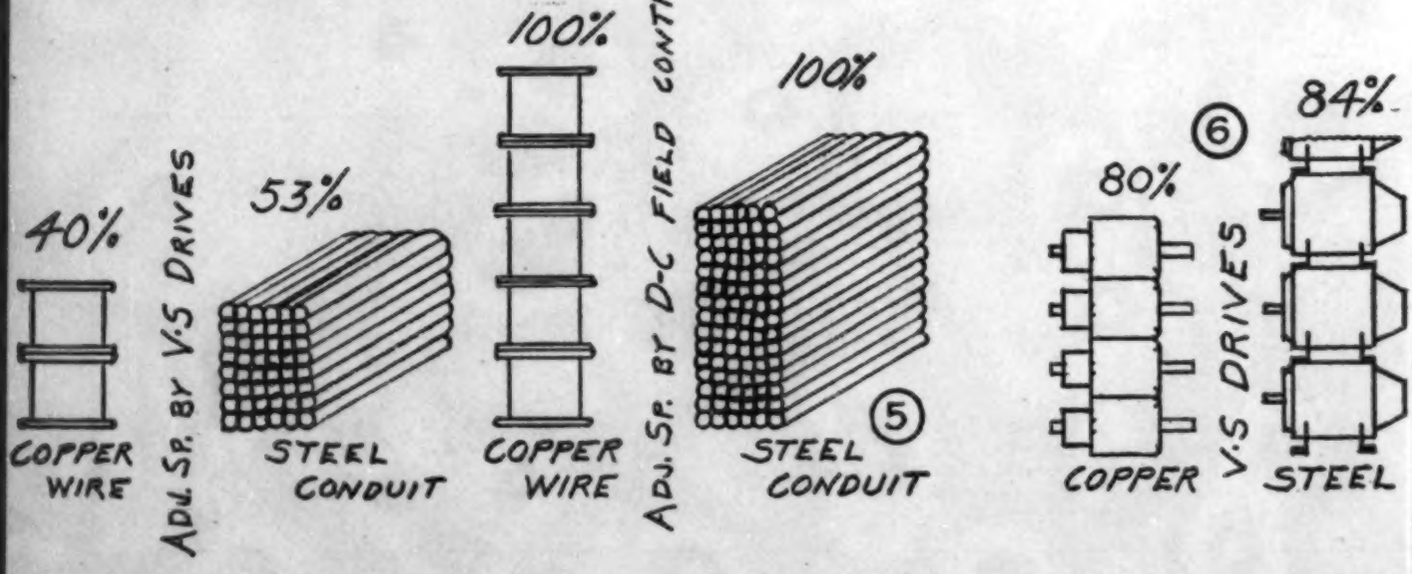
PLANNED MOTOR DRIVES

... save steel and copper

By ROSCOE H. SMITH
Manager of Applied Engineering
Reliance Electric & Engineering Co.
Cleveland



STEEL is more elastic than is cast iron, so the physicists tell us, but how can it be stretched sufficiently to meet all war demands?

Copper available is far below requirements, and probably will be over 1,000,000 tons short of the country's need in 1943. What can be done about it?

Both steel and copper are vital materials in the manufacture of electric motors and in the distribution of power to the machines which these motors are to operate. It is imperative, therefore, to make installations with whatever combination of electrical equipment will result in the least use of copper and steel without impairing the effectiveness of the machine.

Appreciable conservation can be made by giving more consideration to plant planning and layout. The decision as to the kind of motor drive to be applied should be made with the prime objective in mind of accomplishing the necessary results with the minimum expenditure of copper and steel, whether in the plant distribution or in the electrical equipment itself.

Adjustable speed is important to many machines in obtaining maximum output. In the period of industrial expansion prior to the current restricted situation, progressive plant engineers looked upon adjustable speed drives as production tools rather than purely as a means of power. These engineers have made available at each machine the kind of power best suited to its operation, such as direct current for field control, adjustable speed motors, and alternating current for constant speed auxiliaries, with corresponding power distribution and conversion systems.

The adjustable speed drive as a production tool cannot be sacrificed. Its contribution to increased production is too clearly established. *But the method used to obtain that adjustable speed can affect appreciably the solution of the problem of conserving vital war materials.*

Larger plants in particular, commonly have had direct-current circuits to serve adjustable speed direct-current motors. The conversion of this power was superimposed upon the plant's primary alternating-current system. Even under such circumstances, certain machines were frequently placed so as to favor grouping the direct-current motors. This was done in spite of the fact that it might incur a penalty in the form of a less efficient handling of the flow of materials to or from a department.

Fortunately, new variable-voltage adjustable-speed drives have recently been developed and are now in production in sufficient volume to provide a practical solution for many adjustable-speed driving problems. These sets, such as the Reliance V*S drive, are designed to require little floor space, permitting their location at or near the respective machines they serve. The variable speed motors are mounted directly on the machine with speed adjusting rheostats and "start-stop" push button stations placed at the operator's convenience for maximum machine performance. Because all power requirements are served from the regular alternating-current distribution system of the plant, time, expense, wiring materials and accessories are conserved.

Fig. 3 represents a plant with machines arranged to keep material in process, traveling in a direct route from start to finish of the operations. These machines require 17 constant speed drives and nine adjustable speed drives. Power distribution is 440 volts, 3-phase to all drive positions. The V*S drive is used for adjustable speed requirements.

Fig. 4 represents a plant with the same machine and same drive requirements. In this case, however, the adjustable speed is obtained by using direct-current field control motors. The 440-volts, 3-phase power is distributed to all constant speed drive positions. A motor generator set is located at a central point to convert alternating current to direct

(*Please turn to Page* 140)

*Fig. 1—A speed range of 87.5 to 700 revolutions per minute is provided by the 15-horsepower V*S control unit supplying power to a gear-motor drive for this machine. The V*S set takes power from the same alternating-current circuit that feeds the induction motor in the foreground*

*Fig. 2—The 15-horsepower V*S drive here can operate this machine at a threading speed varying from 10 to 120 yards per minute—a 12:1 ratio*

*Fig. 3—Reliance V*S drives are used here to meet adjustable-speed requirements*

Fig. 4—Adjustable-speed requirements, identical with those shown in Fig. 3, are satisfied in this case by using direct-current field-control motors. Note complexity

*Fig. 5—Comparison showing how only 53 per cent of the steel for conduit and only 40 per cent of the copper for wire are needed for servicing the V*S drives*

Fig. 6—Comparison of copper and steel required by the two different drive systems

Fig. 7—Overall comparison of material for drives and power circuits for the two drive systems

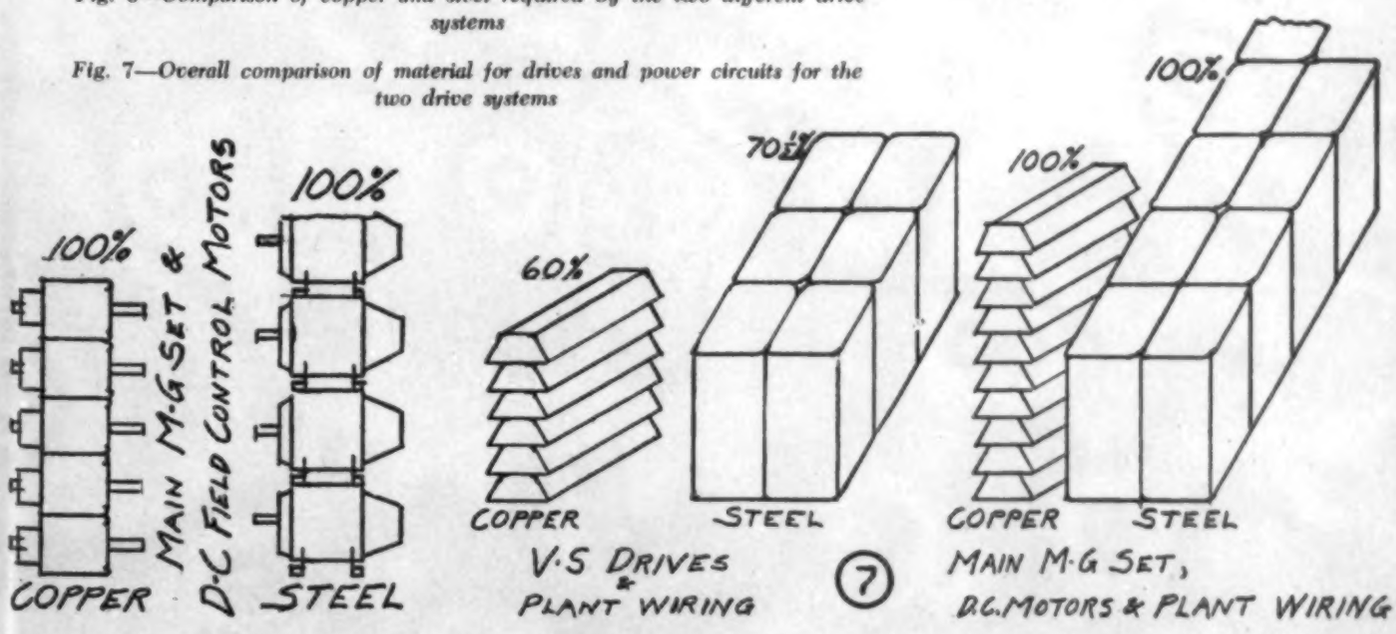
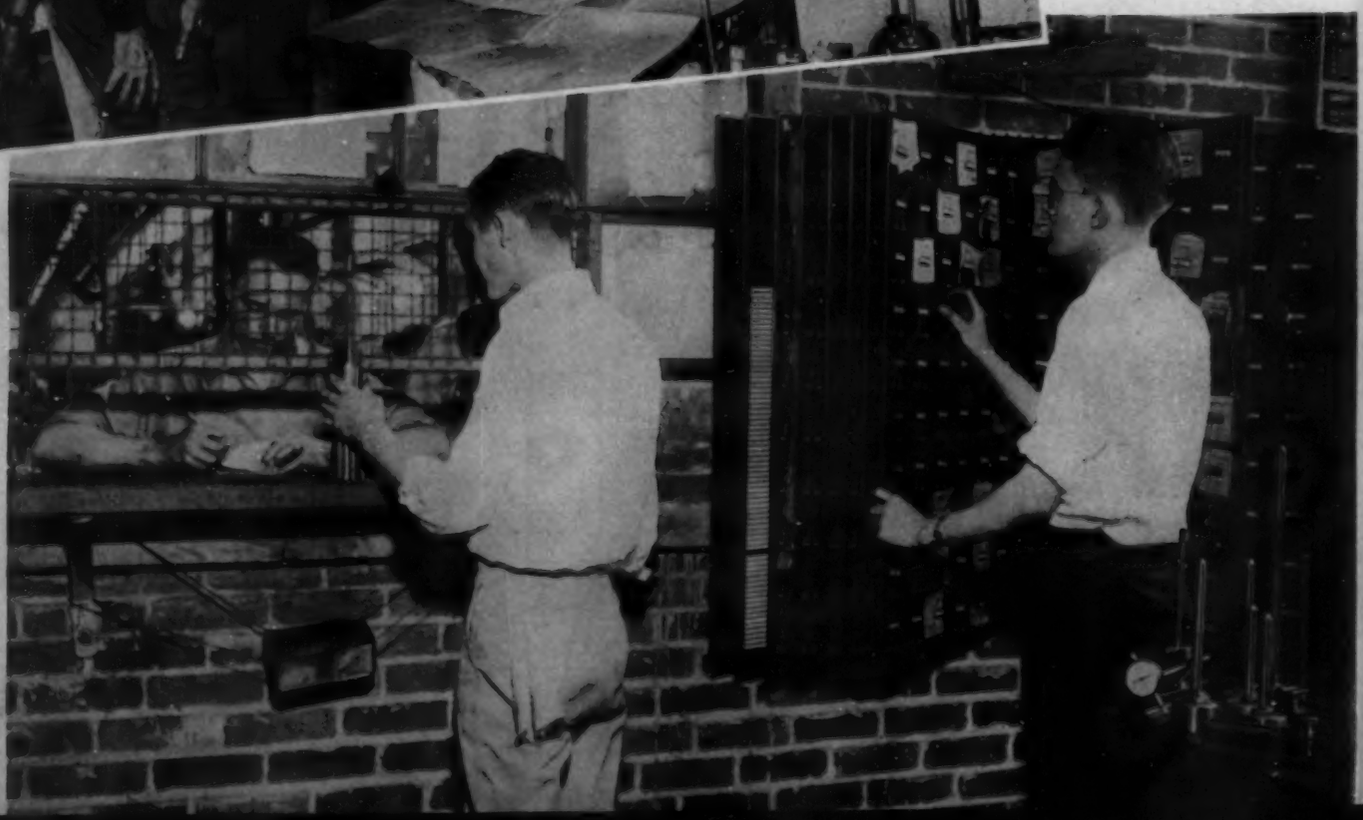


Fig. 1. (Above) — Desert training in California firing 90-millimeter anti-aircraft gun at night. Official Signal Corps photo

Fig. 2. (Left)—These are the men responsible for 90-millimeter gun production at the Wheland plant: Left to right—Fred M. Arnold, chief engineer; Fred McKinney, tool room foreman; Roy Smith, superintendent, tool room; W. H. Wilson, manager; Charles W. Wheland, vice president in charge of production; A. D. Willis, tool engineer

Fig. 3. (Below)—Tool room checks out tools to workmen using register system



By G. ELDRIDGE STEDMAN

-MM. GUNS

Depends Largely Upon Correct Tooling

MARKING the Civil War "battle above the clouds", four Parrott guns today stand sentinel at Lookout Mountain Point over the sweeping Tennessee valley. They were little affairs that lobbed 33 cast iron balls each at the Federals, who were fighting down below. And on the spot where many of their little iron shot bounded, the new Chattanooga gun plant of Wheland Co.'s 90-millimeter gun division is now in huge production on this ordnance piece that has been found so effective in the Tunisian campaign. Among the first in the field on 90-millimeter gun production, the Wheland Co. revamped drawings, did much redesigning, tooling and rebuilding of old machine tools loaned to it from Watervliet arsenal of the Army Ordnance Department.

The company makes all parts of the 90-millimeter gun—breech ring, breech block, rails, supports, internal components, tubes. There are 93 parts in all, a strange and fascinating departure from the crude design of the Parrott gun which was about the only field piece used during the Civil war. The Wheland tooling for the 90-millimeter had a lot of pioneering within it. Methods and practices were established which others are now following. Much credit for the success of the Wheland operation is given to the dynamic drive of its vice president in charge of manufacturing, C. W. Wheland.

Successful mass production of this gun is, of course, entirely a matter of tooling. In the hurry to meet schedules, with production among varied tool companies delayed from three months to a year, it was necessary for Wheland to set up a completely equipped tool room to produce this gun. The company has done practically all the tooling in the plant except standard size drills and taps.

All forms of cutters and special tools, face mills with inserted teeth, special radii cutters, extra-length reamers, special end mills have been designed, adapted and built. The company's unusual ability to go this hard road in tooling alone is, I feel, one of the distinguishing features of Southern manufacturing enterprise.

Fig. 4. (Left, below)—Milling a spline gage in the tool room

Fig. 5. (Right)—Another tool room worker is shown grinding a face mill for use by the gun shop

Equipped with latest models of engine screw cutting precision lathes, milling machines with adjustable tables and heads, surface and cylindrical grinders, jig boring machines, furnaces for hardening and tempering, an air-conditioned laboratory for gage testing, well ordered tool cribs, an optical Bausch & Lomb comparator to check screw thread forms and cutter shapes—this Wheland tool and pattern shop is a model in equipment, efficiency and personnel. The master tool makers at Wheland will tackle anything and they pretty much had to when they took over the 90-millimeter gun as one of the first prime contractors.

Certain drawings for varied jigs and fixtures came from the arsenal, together with a scramble of machinery from which many parts were missing, others broken in transit. These drawings established a criterion, but it was necessary to completely redesign many of the fixtures. These fixtures were completed entirely by the Wheland Co. from the drawing board, through its own foundry, through the machine shop, and on to tool room and gaging laboratory.

The flow of responsibility is from C. W. Wheland, vice president in charge of

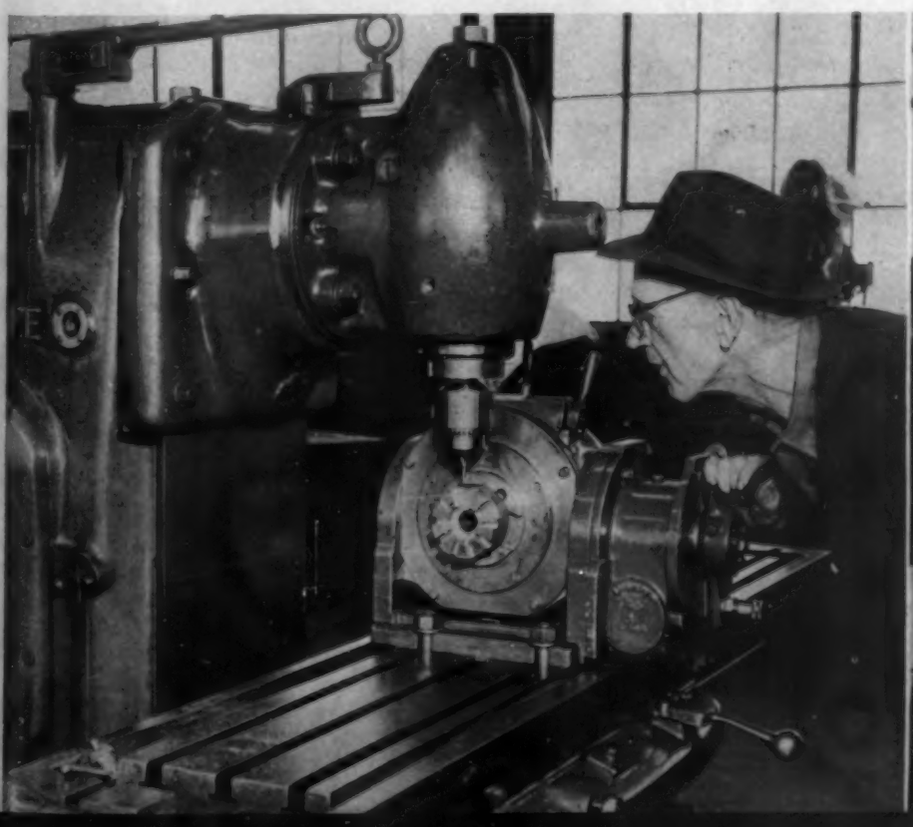


Fig. 6—Cutting teeth into a radius end mill in the tool room

manufacturing; through W. H. Wilson, manager of the gun division; to Fred M. Arnold, chief engineer, gun division; to Roy Smith, superintendent of the tool room, who has co-operating with him A. D. Willis, tool engineer, and Fred McKinney, tool room foreman. Usual output of the company includes woodworking machinery, oil drilling equipment, draw works, rotary pumps and special contract jobs.

C. W. Wheland handed the concepts of jigs, fixtures, patterns of tool design to Arnold, whose staff of draftsmen and technicians have done an excellent job of tool engineering and construction. Outside tool makers were called in on some of this work under the prodding of government expediters for more speed at the start. But 90 per cent of such fixtures were found to be faulty and most of them could not be repaired. Thereafter, the Wheland organization learned to rely pretty much on itself.

Let me take you around this shop and stop to observe a few of the many interesting tools in production the day I was there. Recently a change was required in the machining of forged tubes (gun barrels to you). To properly machine this changed specification it was necessary to revamp the tell-tale gaging instrument previously used in checking the bore. This is the instrument that is used to check the concentricity of the gun tube in and out in the rough so that when placed in the lathe for internal boring and external removal of metal, there can be assurance that equal distribution of metal will be obtained. So a new telltale gage design was on the table under construction when I was there. This gage consists of a bar having what amounts to an outside mircometer set into its tin. The bar arrangement works on a pivot which actuates a specially-designed indicator graduated to thousandths and located on the fixture base, permitting the operator to determine accurately the i.d. of bore to the o.d. checking concentricity at any point on the tube.

Mr. Wilson told me that Mr. Arnold had been seen fooling with a steam gage, brought down to the office entirely dismantled—after a sleepless night. After three days of tinkering, there evolved this new telltale indicator—a very capable gage. It is merely one of many Arnold originations to be found in the Wheland setup.

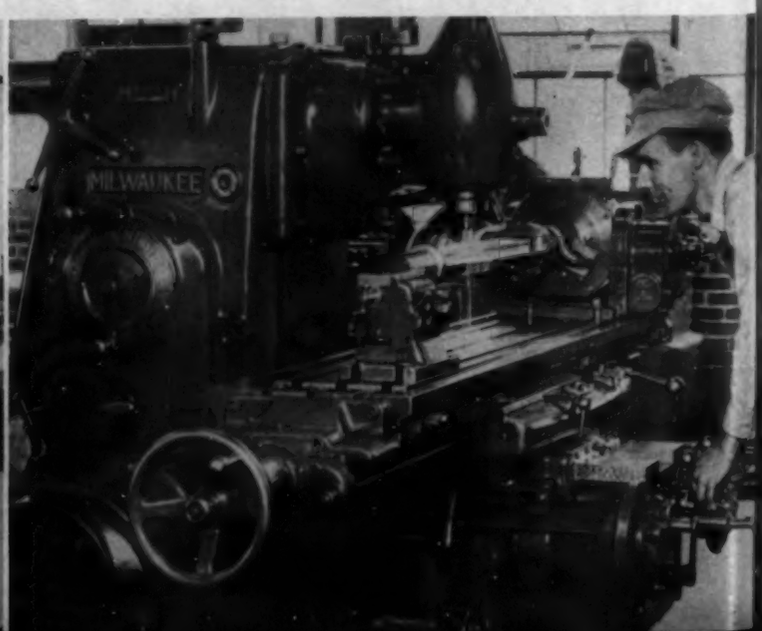
Another interesting tool observed in the making, was a 1-inch radius cutter, processed through the tool room in batches of six. This is hardened to 62 rockwell C. It is made of Clearite—a high-speed tool steel, has 12 flutes. It goes through the gaging laboratory for radius check of 0.002-inch tolerance. This is one of the regular operating phases of the tool room, constantly building these formed end mills that cut exacting radii on the breech ring of the gun.

This tool is forged into a billet by Wheland foundries, turned from this blank to the desired shape, set up in an indexing geared head on a Milwaukee milling machine, gashed with the proper cutter, given a hardening heat treat. After this it is ground, backed up and made into the finished tool on a Cincinnati tool grinder.

The fixture for milling the slot in a support was in proces of construction, another Wheland design. This was really a re-fixturing in that the original had proved a little light. In fact, much present work here is of that nature. Careful survey is being constantly made to improve the tooling that has already been evolved; "re-retooling", they call it. The tolerances on the end slots of

Fig. 7. (Left, below)—Breech ring of 90-millimeter anti-aircraft gun being gaged on surface plate in inspection room. Note special fixtures in which ring is placed

Fig. 8. (Right)—This tool room worker is milling screw slots in a reamer frame to be used in making parts for the 90-millimeter gun



TODAY copper fights on the global fronts

Today the copper industry is working all-out to win the war. No copper is available for anything else. But post-war planners with specific problems in metals are referred directly to the Revere Executive Offices in New York.

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this fixture are 0.001-inch to 0.00125-inch. Locating plugs are arranged to permit revolution of the fixture 180 degrees plus, permitting a second milling operation in the turn to gain proper width of the fastening pads on the support being machined.

The tooling of the intricately contoured Hydro-Tel templets for profiling on the Cincinnati vertical milling machine and the Pratt & Whitney Keller, is another interesting tooling job. These are of hardened tool steel lapped to shape within tolerances of 0.0002-inch. A cast iron lap is used with a lapping compound by bench tool maker. These templets originate shapes and the accuracy of the gun components machined is such as to make this lapping critical. All such templets are checked in the controlled-temperature gaging laboratory.

One of the parts machined on the Hydro-Tel or upon the P & W Keller is the automatic cocking lever. Of its 12 operations, three are profiled by these templets. The right and left hand extractor made from tool room templets and securing fixtures, the sear, breech block and chain terminal cranks, as well as the cocking lever, are intricate parts that are thus machined.

One of the most interesting tools that I saw was the geared offset head used for cutting the extractor pockets. Then there was the wood-pack reamer, used for finish grind of the tube rifling—an exquisite job of tooling.

All fixtures covering the 93 parts of this 90-millimeter gun are made in the company's own tool room. Some were not engineered or designed here, but all of them were constructed here except a few standard tools. Most gun tooling and machining is, of course, of special design. "Designed, cast, finished in our own plant; that is what we are proud of," Mr. Wheland commented.

To check the desired accuracy which is demanded of these 90-millimeter guns, inside and outside diameter micrometers from 1 to 16 inches are used. The tool crib employs a simple requisition control of these instruments. These gages are issued from the tool crib by slip requisition in triplicate. One of these forms is kept by the worker, a second is pegged on the shift call board, a third ultimately gets into the permanent file.

At shift end, the gage is turned in, the paired forms are destroyed, the file form is used to signal the gage inspection requirements of that shift. All gages and other tools are routed to the controlled-temperature laboratory at shift end where they are inspected and adjusted under controlled temperature conditions and made ready for the shift use the next day. This prevents entirely such alibis as "he tampered or dropped the gage on the last shift." This inspection is of 24-hour nature and no shift works with gages that have been used more than 8 hours without inspection.

Stepping into this controlled-temperature room in charge of E. R. Williams, a tool engineer and master toolmaker, I came first upon an instrument that is known as a rail gage and is used for dimensional control of distance between support pocket and breech ring pocket, with tolerance within 0.003-inch. It takes about 4 hours to acclimate the metal of this gage to the 68 degrees Fahr. temperature constant of this controlled atmosphere room.

I noticed a box of 34 broaching cutters, sparkling like jewels. They had just been reground and were in for final inspection before going out to rifle more gun barrels. Before these are placed back in the plant for use, they must pass through a tool grinding inspection in which each broach blade is checked on the comparator for form, tool shape and radius of the tool lip.

This gage inspection control room abounds with the most modern equipment. Hoke A-B-C blocks are used, the reference sets, of course, being in the laboratory while the production inspection sets are used in the shop. There are such other fascinations as master gage blocks, super micrometers reference verniers, comparators, sensitive indicators.

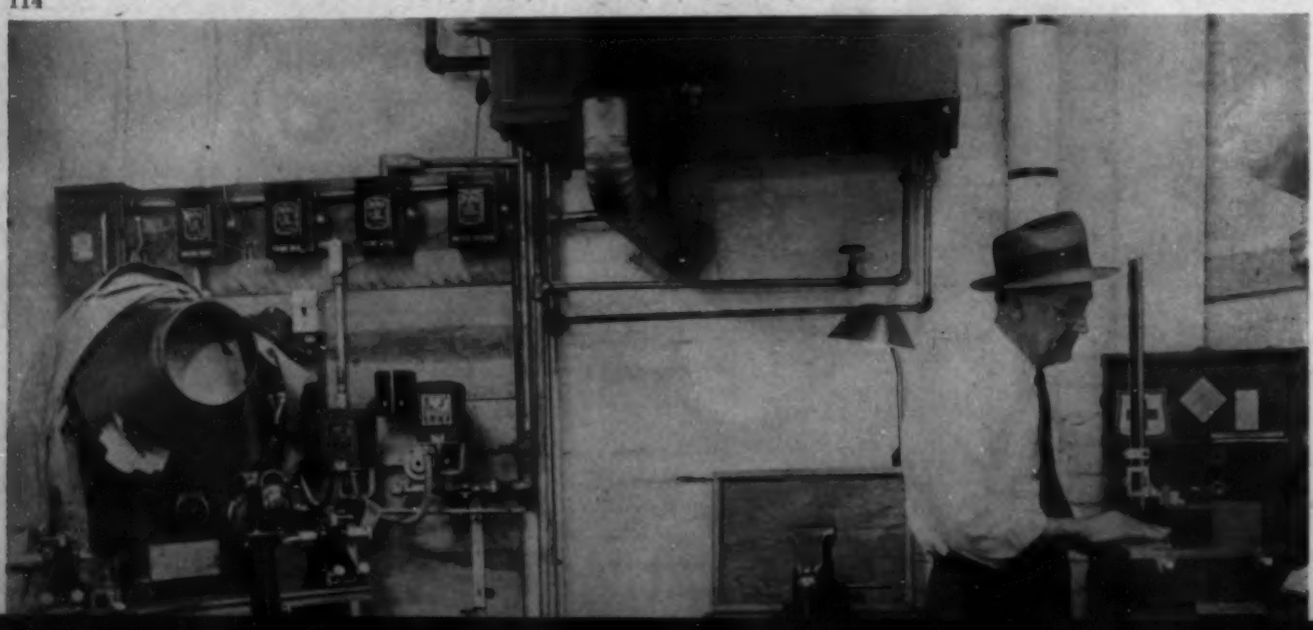
There are many inspections throughout the gun division, Mr. Wheland's policy being that of catching the error at the seat of the crime. This saves man hours that otherwise would be expended. In addition, there are other production inspection checks on critical parts. For example, when the breech ring comes from the machines, it is taken over by bench workmen who use hand files, hand grinders, emery cloths and lapping compounds on certain critical radii to eliminate all rough edges, and to assure by varied plug, screw and depth gages that all holes have been properly machined.

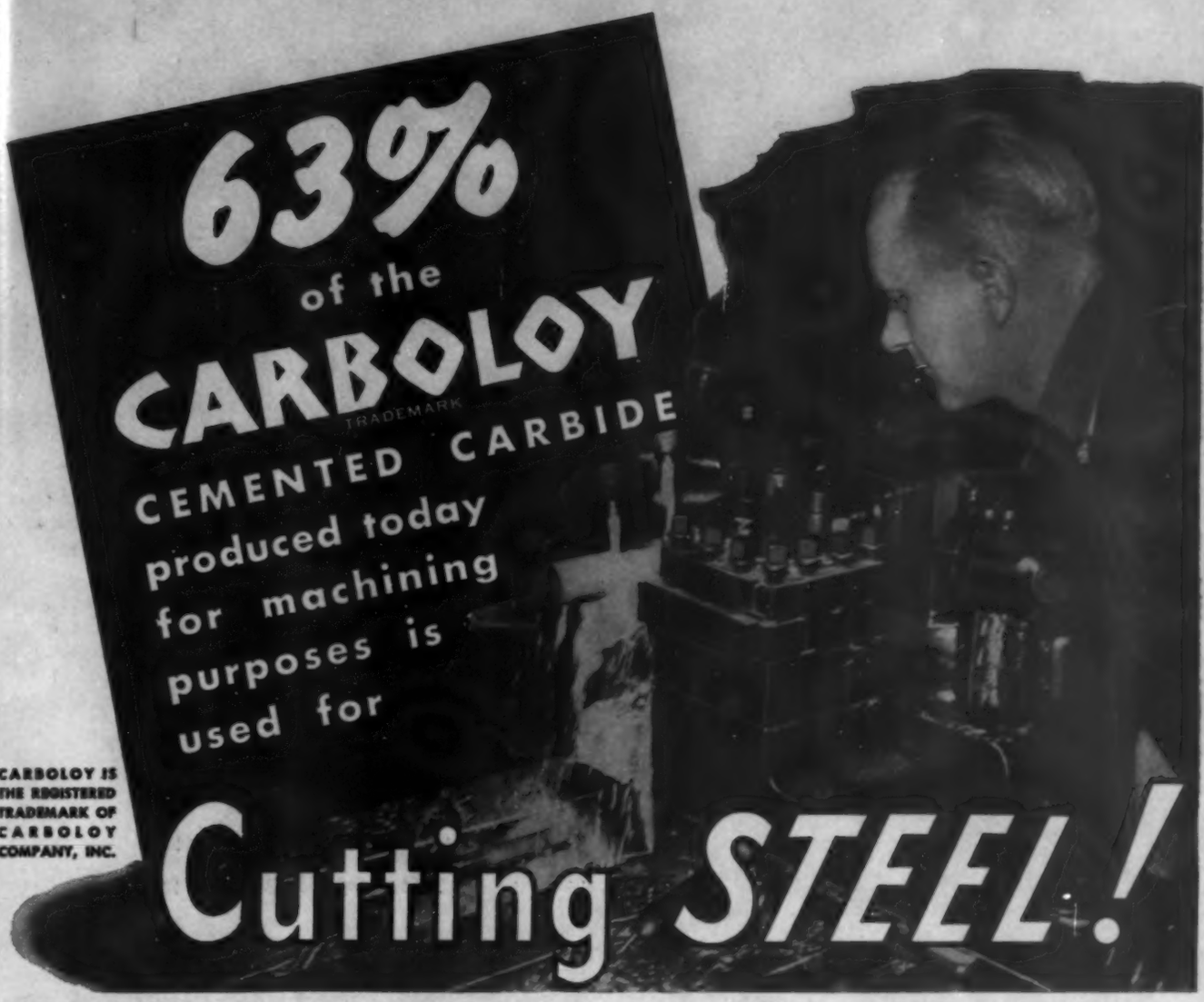
From here, on a specially designed dolly, the production inspected breech ring goes to the final inspection room, air conditioned for accuracy. Before arriving, this ring has received more than 20 production inspections. After being in the final inspection bays, every screw hole is checked in relation to major and minor diameter of thread, depth, elimination of sharp corners, agreement with tolerances on all radii, planes, angles, vertical and horizontal measurements.

Chief inspector is R. R. Caskey. For a time, because of its necessary standards in establishing quality inspection control, the Army Ordnance Department maintained a large "on-the-ground" inspection staff. Since Wheland has delivered, the department is composed only of company men, a small complement of army men remaining only to sample the final inspections. All components of the gun are inspected, so far

(*Please turn to Page* 143)

Fig. 9—Portion of temperature controlled gage room. Optical comparator at left





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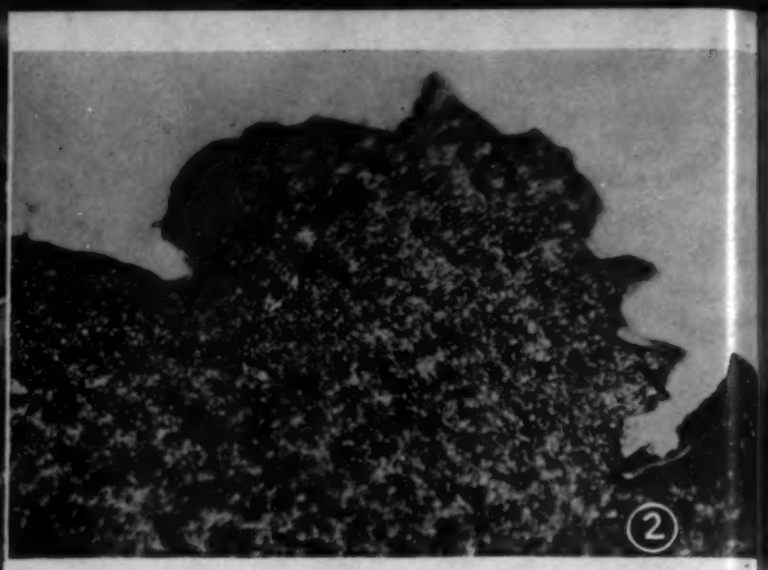

Fig. 1—Spraying on a protective coating of lead-base alloy by means of a special device for handling this low-melting point material. This is a ready method for renewing the zinc coat on welded sheet metal constructions where the heat of welding has vaporized the original coating

Fig. 2—Micrograph at 500 diameters shows mechanical bond between sprayed metal (dark) and steel base (light area). Smooth base metal is readily tinned by this method

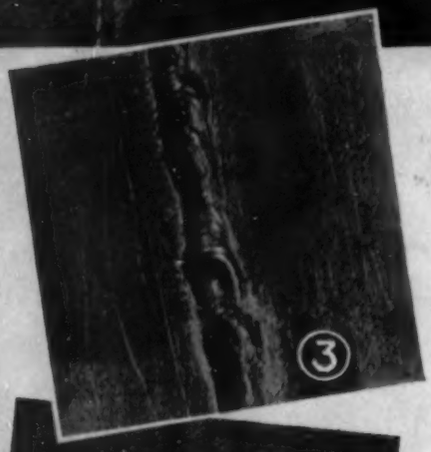

Fig. 3—Portion of arc weld before spraying

Fig. 4—Same arc weld after renewing original protective coat by spraying. Method applies coating that is evenly distributed, positively covers base metal and serves as excellent base for paint

ALLOY-SPRAYER

. . . . coats new work, "regalvanizes" old material, patches weld-burned areas

A RAPID low-cost means of applying a protective metal coating to metal assemblies or structures, of re-coating areas from which the galvanizing has been burned by welding, and of patching or repairing small areas in large galvanized assemblies where the coating has been damaged, has been developed by the Alloy-Sprayer Co., 2040 Book building, Detroit.

The operation involves spraying the surface to be protected with a coating of "Galv-Weld" metal by means of a special spray gun. This unit is a portable, self-contained gun-type device with thermostatically controlled metal melting pot and a means of atomizing and spraying the melted metal. It is operated by air under pressure in much the same manner as a paint sprayer. A trigger control button on the handle is pressed during the actual spraying. The equipment is sufficiently light and compact so that even when filled with metal, it can be manipulated readily by hand.

Moreover, it appears that an actual tinning of the base metal with the sprayed metal is effected by the process. Thus, under certain conditions, sand blasting or other extensive preparation of the surface of the base metal is not necessary. This can eliminate former costly and tedious preparation methods.

A typical use of the sprayer is for regalvanizing areas from which galvanizing has been burned during arc or resistance welding operations. The oxide remaining from the welding operation first is thoroughly brushed off and the area adjacent to the weld similarly cleaned. Then, while the metal is still hot, the entire burned surface can be sprayed. The thickness of the coating will be from 0.001 to 0.008-inch, depending upon the degree of resistance to corrosion required.

No Skill Required

Since it is not done at the welding station, the spraying can be accomplished by unskilled operators at less labor cost.

Where production sequence does not permit coating immediately after the welding operation, the work first is cleaned and then reheated to 250 to 475 degrees Fahr. and then sprayed. This procedure has the advantage of keeping the operation uniform and the results positive, since the reheating permits the temperature of the base metal to be at a known rather than an estimated level. Reheating for spraying is accomplished by infra-red lamps, oven, or by an open flame, preferably one with a reducing atmosphere. The latter is not absolutely essential, but it has been

(*Please turn to Page* 139)

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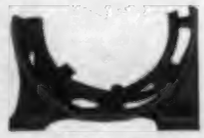


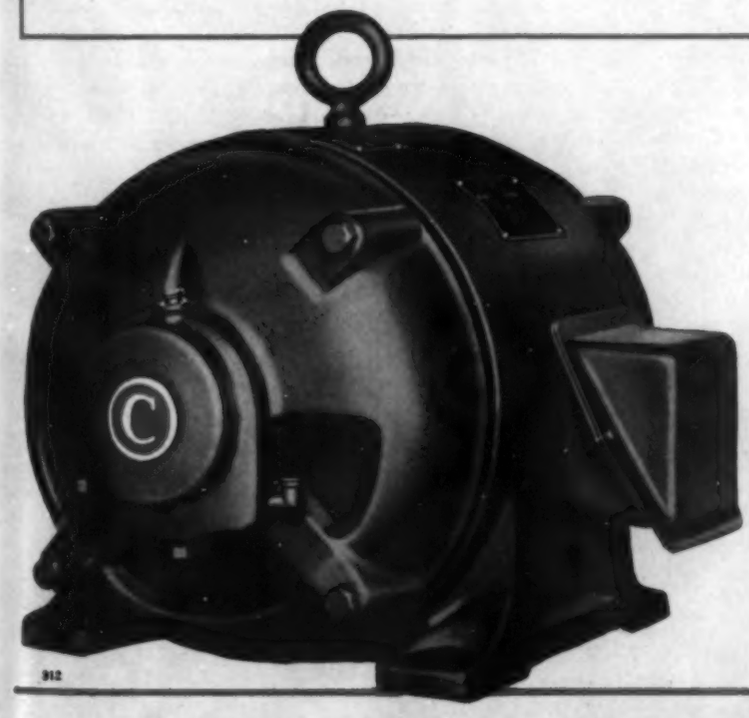
1 The feet are cast as part of the motor frame with machined mounting surfaces providing for a firm attachment and alignment, essential when the motor is incorporated as part of precision equipment.

2 Rigid curved end-brackets are braced for permanent alignment of bearings to maintain a concentric magnetic field, essential to uniform characteristics and quiet operation.

3 Heavily ribbed cast iron frame holds the stator laminations in place — they are locked under pressure — they cannot shift position — the air gap is maintained.

4 A machined bead with close tolerance on the end-bracket fits inside a similarly machined surface on the motor frame — this accurately and permanently aligns the bearings in relation to each other and to the motor frame.

5 The rigid steel shaft is larger in diameter through the rotor which prevents deflection — protects against bearing wear.



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SPOT WELDING ALUMINUM

TABLE IV—Composition of Aluminum Alloys Welded by the Aircraft Industry

Alloy	Copper	Manganese	Magnesium	Chromium	Aluminum
24S	4.2	0.5	1.5	None	Balance
52S	None	None	2.5	0.25	Balance
3S	None	1.25	None	None	Balance

TABLE V—Minimum Shear Strength of Spot Welds in Aluminum Alloys

Thickness of one sheet of two equal thicknesses welded, inch	Alloy welded 3S-½H 3SH	52S-½H 52SH	24ST 24ST Alclad
0.016	55	90	120
0.020	75	120	160
0.025	100	170	215
0.032	140	240	300
0.040	190	340	430
0.051	280	510	620
0.064	390	720	840
0.081	570	1000	1080
0.102	800	1320	1320
0.125	1000	1620	1450

TABLE VI—Improvement in Spot Welds by Heat Treating 24ST Alclad

	As Welded	Heat Treated
Average shear load in lbs.	1071	1452
Max. shear load in lbs.	1254	1618
Min. shear load in lbs.	946	1260

Gain by heat treating is 35.5 per cent

In first section of this article last week, application of resistance welding to aluminum aircraft structures, different types of welding machines and electrodes were discussed. Here are presented details of cleaning methods, a study of the metallurgical factors involved and an examination of possibilities of further expansion of spot welding to aircraft structures

(Concluded from Last Week)

THE FOLLOWING aluminum alloys are found in aircraft construction: 24ST, 24ST Alclad, 52S, 3S-½H and 3SH. In Table IV the composition of the various alloys is given. The number followed by the letter S indicates the alloy. *T* means heat treated and aged while *½H* and *H* represent cold working to the half hard and fully hardened conditions.

Both 24S and 52S have heavy oxide coatings which are customarily removed before any spot welding is performed on them. Likewise 24ST Alclad gives better welding results if the surface is prepared prior to welding. Both mechanical and chemical treatments are suited to the surface preparation of the aluminum alloys.

Mechanical cleaning is accomplished with a fine grade of abrasive cloth, with fine steel wool or with a fine scratch brush driven by a motor. In mechanically cleaning alclad alloys care must be taken not to remove the thin coating of pure aluminum that makes up the corrosion resisting surface.

In chemical cleaning, several different solutions have been used with success. In some cases the surface preparation is carried out by dipping while with large surfaces it may be necessary to paint the etchant on with a brush, allow it to stand for 30 seconds and sponge it off with a wet cloth. One dipping procedure is the following:

Dip the parts for 30 seconds in a 5 per cent sodium hydroxide solution at 150 degrees Fahr., rinse in cold water, dip for one minute in 50 per cent nitric acid at room temperature, rinse in cold water, rinse in boiling water and dry. In some cases it may be necessary to repeat the alkaline and acid dips to thoroughly prepare the material. The commercial cleaning agents are used in accordance with the manufacturer's directions.

Fig. 3. (Left, below)—Diagram of spot weld pull-test specimen

Fig. 4. (Right, below)—Representative metallurgical zones in a spot weld in 24ST Alclad

The chemical solution that is used for brushing is made up according to the following formulae:

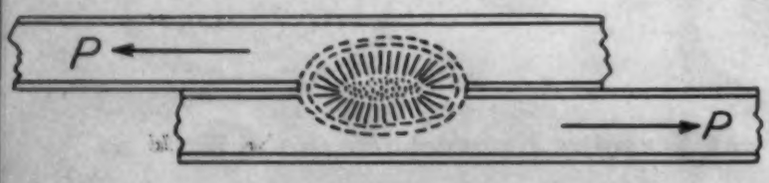
Solution A—2.9 pounds gum tragacanth
8 pounds hot water
0 to 7 pounds denatured alcohol

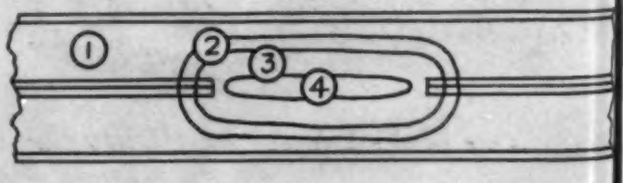
Solution B—10 pounds 30 per cent hydrofluoric acid

A wetting agent may be necessary with oily stock. The amount of alcohol is varied according to the difficulty encountered in dissolving the gum. The hydrofluoric acid is added to solution A after that solution has been made up.

Too much attention cannot be paid to the preparation of aluminum alloy surfaces for welding. T. E. Piper of Northrop Aircraft Inc. reports that 30 million spot welds were made in one year without a single hole being blown because of improper surface preparation. His company uses a bath consisting of phosphoric acid with a cleaning agent added. It has the advantages of being used at room temperature with a rather long period in which etching may be done without harm to the material. Results obtained with this bath are shown Fig. 5. Complete assemblies are prepared for spot welding with the most efficient use of cleaning labor yet reported.

Machines are set up for spot welding





THERMIT WELDING

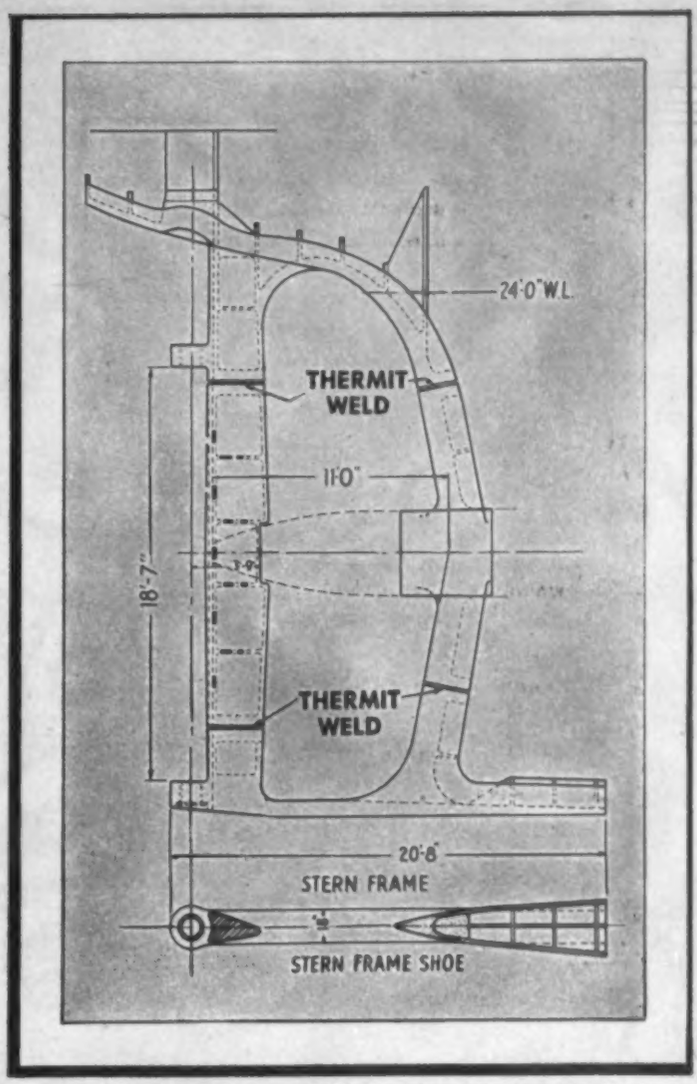
Speeds Fabrication of Large Parts

To speed construction many shipbuilders now fabricate stern frames from four or more separate castings by means of Thermit welding.

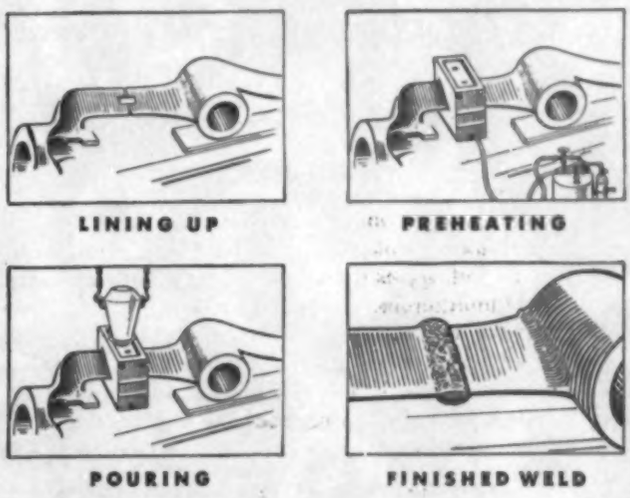
This method also provides the greater strength needed to meet the tremendous strain stern frames are subjected to by wartime zigzagging and top speed maneuvering in heavy weather.

Thermit welding is being used to great advantage throughout industry in fabricating other large parts. When several small castings are Thermit welded into one large unit, imperfections, which may occur in very large castings, are avoided. There is additional assurance of extra strength because the welds are even stronger than the original castings of the same cross sections. Shipping is simplified, as small pieces—easier to handle and requiring less space—can be shipped more readily to the job and fabricated after arrival. Little, if any, machining is needed preparatory to welding and no stress relieving is required.

Send for informative, 30-page booklet, "Thermit Welding", describing many applications for both fabrication and repair of heavy parts.



Showing location of Thermit welds in diagram of stern frame for U. S. Maritime Commission ships.



Some of the simple steps in the Thermit process for either fabrication or repair work.

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along empirical lines. Usually plant experience is such that the several variables can be present, but universal practice is to check by means of a test coupon to make sure that the resulting welds will be acceptable. Samples such as the one pictured in Fig. 3 are quite common and the failures fall into three distinct types which are known as "pulling the button" as shown in Fig. 6A; "pull out" shear as shown in Fig. 6B; or clean shear as shown in Fig. 6C. The type of failure is an index to the proper establishment of welding conditions. Tensile tests have given a good account of themselves as a means of checking the quality of spot welds.

Frequently a cross section is made of a weld as a check upon the welding procedure. A hack saw cut is made through the center of the weld nugget, the cross section is smoothed with a file and the weld region is brought out by means of an etch in 10 per cent caustic solution. Primarily this test is designed to reveal the area of the weld which should have a diameter equal to twice the thickness of the sheet plus 0.060-inch. The weld zone should extend at least 50 per cent into the part being joined.

Still another method of preparation is used to bring out more details in the weld structure such as internal cracks and porosity. Specimens are mounted, preferably in the plastic mounts that are found in most metallurgical laboratories, and prepared for etching and microscopic study by means of the usual technique. Etching is accomplished with the following solution: 0.5-mil-liter hydrofluoric acid, 1.5 mil-liters hydrochloric acid and 2.5 mil-liters nitric acid and 95.5 mil-liters of water.

Examination of specimens correctly prepared will show the size, shape and location of the weld zone, the structure of this region, the effect of heat from welding and the presence of cracks and porosity, if any. The principal zones for 24ST Alclad are those illustrated in Fig. 4 and are as follows:

Zone 1: This region shows a typical structure of heat treated and aged 24S which is a rather complicated arrangement of aluminum alloyed or compounded with other elements that make up this material.

Zone 2: This region shows the effect of the welding heat upon the alloy. Agglomerated $CuAl_2$ which was invisible under microscopic examination in the heat treated and aged plate, now becomes large enough to be seen. The inner portion of Zone 2, in which incipient fusion has taken place, is considered to be the weakest portion of the weld and is often referred to as the "burned" zone.

Zone 3: This is the weld nugget

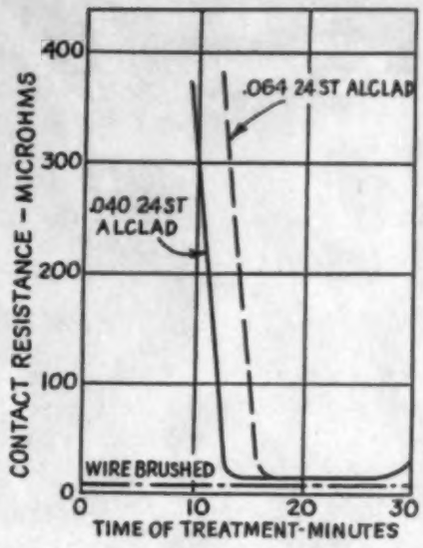
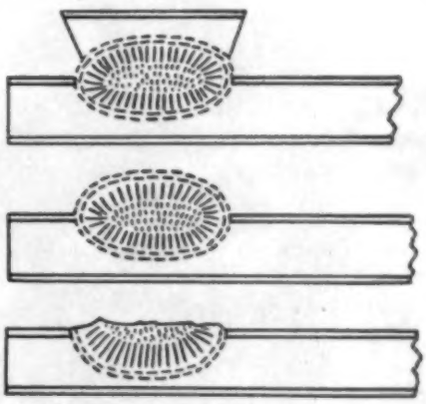


Fig. 5 (Above)—Comparing the electrical resistance of chemically and mechanically cleaned Alclad. Northrup etching solution used

proper and has the typical columnar structure that is always found in spot welds.

Zone 4: This central portion of the weld nugget reveals a somewhat different structure than Zone 3 with the differences being ascribed to an inherent lack of homogeneity in the nugget as may be expected from the fraction of a second allowed for melting and solidification.

In Table V some of the typical strengths to be expected from spot welds are given. Since spot welds are generally loaded in shear, the strength of the weld becomes a function of the alloy welded, the thickness of the material welded, and the machine settings used in making the weld. Welds made with recommended machine settings and with a diameter equal to twice the thickness of the sheet plus 1/16-inch will exceed the minimum strengths shown in Table V.



From top to bottom—

Fig. 6A—"Pulling-the-button" type of failure

Fig. 6B—"Pull-out" type of shear failure

Fig. 6C—Clean shear failure

Welds made with the stored-energy type of welding machines are equal to or better than those made with alternating current machines. Frequently the stored energy units make larger spots which accounts for a higher shear strength value when one is observed.

Although spot welds are primarily designed for shear, stresses brought about by tension loading are introduced by secondary loads. Spot welds in tension have from 20 to 90 per cent of their shear strength. Strength in tension may be determined by means of the U-shaped tension test piece.

For some time it was obvious to metallurgists that the strength of spot welds in 24ST material was less than it might be if the heat treatment of the sheet had not been nullified by the heat of welding. In heavier sections, especially, this lower strength was noticeable. However, the introduction of heat-treated spot welds has permitted restoration of considerable strength, resulting in a 35 per cent improvement in the shear strength of heat-treated spots over those not given any heat treatment. Table VI gives the results of 100 tests in the as-welded and heat-treated condition to prove this point.

Spot welds in the following aluminum alloys are as resistant to corrosion as those portions of the material that have not been subjected to the welding heat: 2S, 3S, 52S, 53S and 61S. No difference will be found between the corrosion resistance of these alloys as spot welded or as riveted. With 24ST Alclad, corrosion resistance is provided by the cladding but care must be exercised to see to it that the cladding is not contaminated by the alloy of the main body of the sheet through overheating. Spot welds in alloys 17ST and 24ST are selectively attacked under corrosive conditions. Of course paints have found widespread use as protective media in many services.

The present widespread use of spot welding in joining the aluminum alloys has been the fruit of much intelligent research which solved the vexing problems of surface preparation and efficient use of electrical current. Surface preparation through both mechanical and chemical treatment has brought about a high degree of consistency in spot welding practice. Good metallurgical and physical controls have followed through to make the spot welded structures almost foolproof. And the introduction of energy-storage spot welding machines has done much to keep electrical power demands within reason.

The words of J. W. Dawson and B. L.

(*Please turn to Page* 124)

MATERIALS HANDLING PRINCIPLES

....every plant manager and foreman should know

By ASA S. KNOWLES

PRINCIPLES:

- ***Reduction in travel distances.***
- ***Increased speed.***
- ***Elimination of waste motions.***
- ***Use of mechanical handling when economical.***
- ***Avoidance of duplication of investment.***
- ***Co-ordination of interdepartmental handling.***

NO ASPECT of shop management gives more concern to many foremen than that of material handling. While it is true that some plants designate particular persons to devote their entire attention to solving internal and outside material handling problems, all foremen must devote some of their time to material handling as it concerns their particular departments. Every foreman appreciates that the size of the output of his department may hinge largely on the efficient and smooth flow of material in process.

Material handling systems as found in present day industry vary. Some plants have no systems at all, and others have systems so highly developed as to be almost flawless. This depends largely upon the nature of the manufacturing process and the amount of time, energy, and money that has been devoted to this problem.

No two plants have exactly the same type of handling because factory buildings and their layouts differ widely. Regardless of the kind of industry, the manufacturing processes involved, or the quantity of materials to be moved, there are *basic principles* of handling with which every foreman should be familiar and which deserve careful study.

Objectives: From the time raw materials are received until they are fully fabricated and placed in finished goods storage, material handling is the backbone of manufacturing. Low manufacturing costs can be achieved only when waste is at a minimum in the use of men, machines, and equipment devoted solely to getting materials through the manufacturing process. *The best way to handle materials is not to handle them.*

The best way to handle materials is not to handle them

Constant study of material handling operations reveals the following as the fundamental objectives:

Principles: In approaching a material handling problem, it is first necessary to determine *what to move*. When several processes and machines are used in the manufacture of a product, management must decide between moving the product from process to process and moving machines, operators, and supplies. In brief, either the product, the worker, or his tools may be stationary, while other factors are moved. When it has been decided what is to be moved, a further analysis of the problem should be made in the light of these items:

—Reduction in travel distances. All distances between manufacturing operations should be reduced to a minimum. An analysis of the distances traveled on the production floor in moving materials from operation to operation often leads to new location of machinery and equipment, as well as revision of steps in the manufacturing process.

—Increased speed. Only when speed and efficiency are combined in the handling of materials is productive equipment kept constantly busy at maximum capacity. The efficiency of the plant as a whole is greatly increased.

—Elimination of waste motions. Much effort is wasted in handling, piling, and storing of materials because of poor arrangement of manufacturing and storage areas and because improper types of handling equipment are used.

Needless handling operations can be eliminated when the movement of materials is carefully studied with a view to tying in material handling procedure with the layout of the production floor.

This leads particularly to the elimination of "bottle-necks" (places where production tends to slow up because of piling up of materials in process). When handling is studied in relation to layout of the plant as a whole, potential bottlenecks are minimized.

—Use of mechanical handling when economical. When operations are performed continuously, the use of mechanical handling equipment usually results in savings in time and cost, as well as lessening the total time required to complete a manufacturing process.

It is often unwise, however, to use mechanical handling equipment when handling operations recur infrequently because such situations do not justify an investment of capital and special equipment.

—Avoidance of duplication of investment. Unnecessary duplication in material handling equipment increases costs. Many department foremen want their own material handling equipment for exclusive use, even though it is used only occasionally.

This practice must be carefully regulated and unnecessary duplications of equipment avoided. Money invested in permanent handling equipment increases

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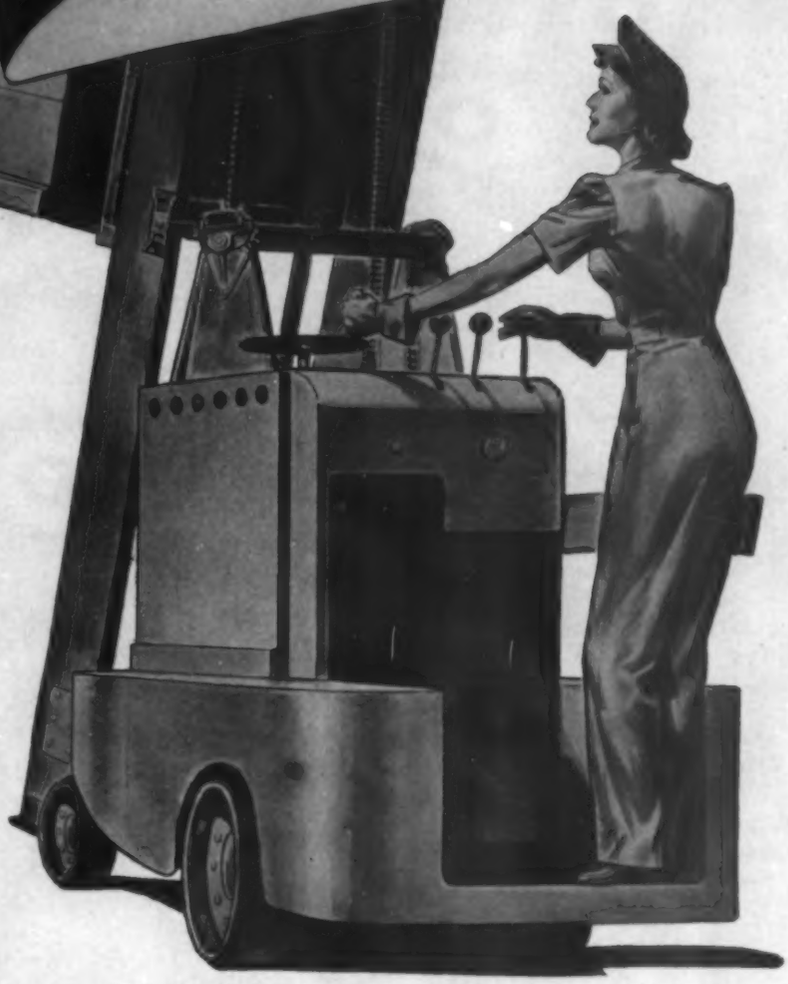
Abstracted from *Supervision*, May, 1943.

"It's easy to handle ...it must be an Exide"



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the fixed costs, such as taxes, insurance, maintenance, etc.

Every foreman's interest in good management should compel him to see to it that investments of funds in handling equipment are kept at a minimum in order that the funds of the business may be used for the most productive activities of the enterprise.

—Co-ordination of interdepartmental handling. Just as standard railroad equipment is a tremendous advantage in the nation's transportation system, internal plant handling systems should permit continuous and flexible service. Equipment needed in one department should be adaptable to possible future uses in other departments.

Standard tracks, roadways, container sizes, etc., permit shifting of equipment to prevent bottle-necks occurring at unforeseen times.

—Materials to be moved. This involves consideration of whether unit articles are to be moved, or whether they are to be placed in containers or kept in bulk. This in turn resolves itself into a consideration of the physical characteristics of products, containers, and bulk materials.

—Care and condition required. Temperature, humidity, shock, etc., must be considered. Oftentimes, drying, shaping, or hardening may be performed during transportation.

—Transportation required. It must be decided whether materials are to be moved horizontally, vertically, and attention must be given to piling, loading, and unloading.

—Quantity and time requirements. The amount of material required to be moved per period of time, such as tons per day, etc., deserves attention. In addition, careful attention must be given to whether or not the demand for these materials is continuous or just occasional.

Finally, the length of time (months years, etc.) the service will be needed requires study.

Other matters which must be examined in the analyses of material handling problems are these:

Power available;

Best route to be followed;

Costs of equipment and installations, and operating costs;

The maintenance costs of the equipment to be used.

The labor problem—amount of trained personnel needed (if any), license required, etc.; and finally,

Lost time of productivity due to change-over of material handling methods.

This involves both man and machine hours lost which cannot be recovered.

Of major importance are the various techniques used in transportation of materials; problems of piling, loading and unloading; use of standard material handling equipment; and the methods of calculating quantities of material handling equipment needed to meet given situations. All must be studied and worked out for most effective flow of materials through the plant.

Practice on Forged Hand Tools Now in Print

Printed copies of simplified practice recommendation R17-43, "Heavy Forged Hand Tools", recently revised at the request of and in co-operation with the War Production Board, are now available, according to Division of Simplified Practice, National Bureau of Standards, Washington.

The first edition of this recommendation, approved by the industry in 1924, listed 361 items or 54 per cent of the 663 varieties of forged tools then offered.

The recommendation was revised in 1927, 1931 and again in 1935. These enlarged the scope of the recommendation to include successively, eye sizes and shapes, railroad tools and certain additional industrial tools. The edition of 1935 contained 479 items. The present revision contains 351 types and sizes.

In addition to the revised simplified schedule itself, the new publication includes a brief history of the development of the project. Copies may be obtained from the superintendent of documents, Government Printing Office, for 10 cents each.

Ohio State Completes Welding Library

A new library on welding, a gift of A. F. Davis, vice president and secretary, Lincoln Electric Co., Cleveland, has been established at Ohio State university, Columbus, O., according to Mr. E. N. Manchester, university librarian.

The "A. F. Davis Welding Library," as it is known, was placed there as the university has the only 4-year course in welding engineering. This is said to be the first time all important literature on welding has been concentrated in one place.

Non-Irritating Cream Removes Paints from Hands

A new compound for removing lacquer, dopes and paints from the hands without the use of explosive solvents is reported by Dennis Chemical Co., 2701 Papin, St. Louis.

Called Den-Tex, it is merely worked into paint or lacquer on the hands which then readily rinses off with water, leaving the pores open and clean and the skin soft.

The product is said to insure the removal of the most tenacious and resistant material such as airplane dopes, enamels, varnish, resin solutions, etc.

Spot Welding Aluminum

(*Concluded from Page* 121)

Wise in presenting some thoughts worthy of consideration in promoting a still further application of spot welding have done such a good job that they are quoted as a conclusion for this article:

—*"The spot welds performed in aluminum alloys for aircraft structures are overly suspected.*

—*"This suspicion is not supported by the accumulated performance history of planes welded by the earlier technique.*

—*"Efforts are being directed toward metallurgical perfection of the weld nugget rather than to the requirements for structural adequacy of the welded assembly.*

—*"Weld inspection and test methods have been developed to disprove the metallurgical perfection of the weld rather than developing methods to determine the relative performance of welds of varying metallurgical perfection."*

There is every chance in the world that the riveting of aircraft structures is not 100 per cent perfect. But operational experience has shown that riveting is a worthy fabricating method. Although weld tests have been quite severe, weld quality is attaining the goal of metallurgical perfection. As a result an increasing number of primary structures are and will be flowing through the powerful jaws of spot welding machines.

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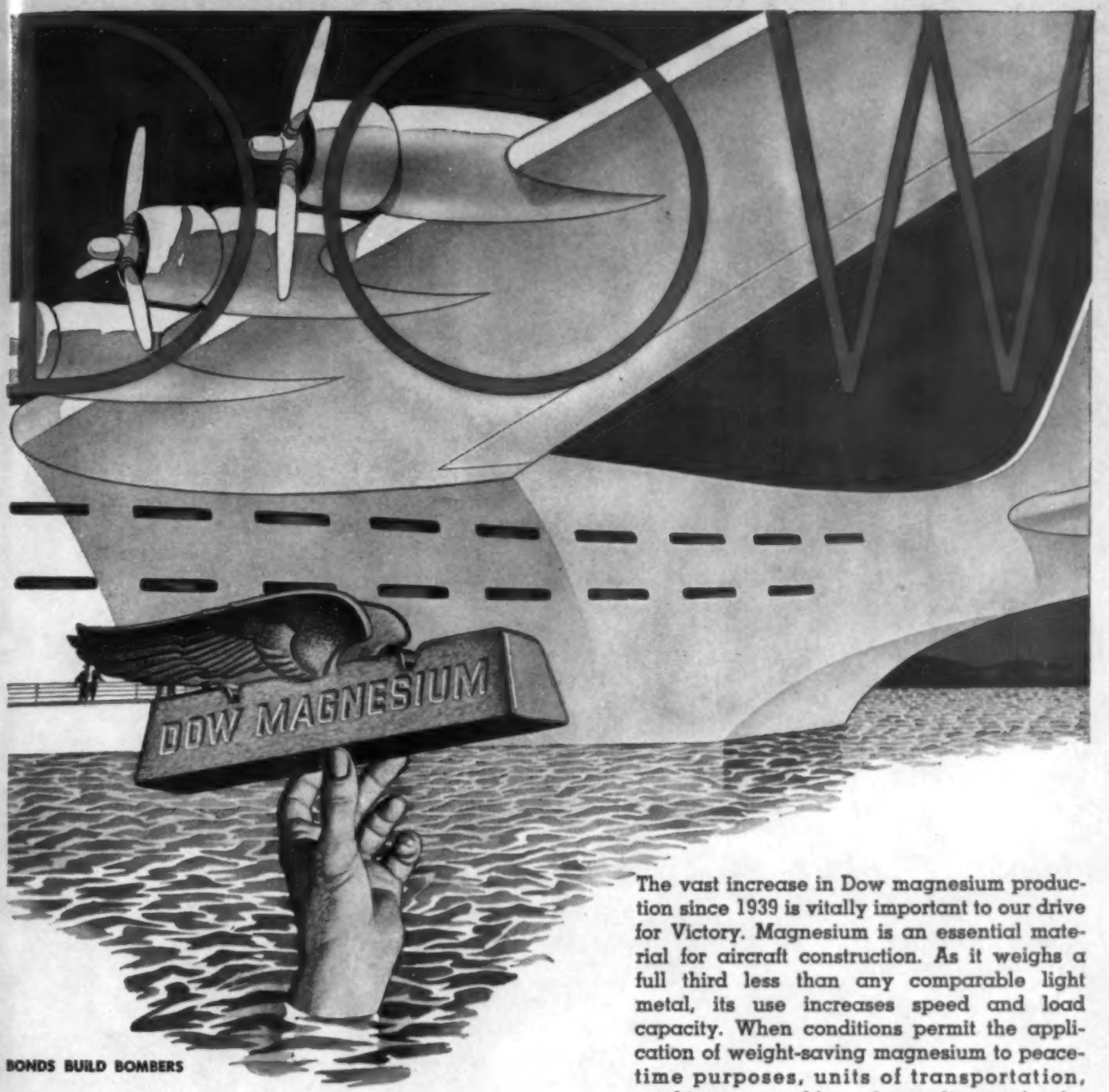

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Left, above—Entry end of line up to fusion unit platform

Center—General view of control

Electrolytic Tinning Lines

Help Solve Tin Shortage

By RICHARD A. GEUDER
Manager, Metal Industry Application
Reliance Electric & Mfg. Co.
Cleveland

MORE OF the gap between the demand for tin plate and the available supply will be bridged soon with the completion of several of the new continuous electrotinning lines which have been under construction for the past year. The line at the Irwin Works of Carnegie-Illinois Steel Corp., Pittsburgh, was the first to go into operation of the 26 new plating units being built at top speed by 11 steel companies to meet the emergency created by Japan's conquest of most of the world's tin supply.

Government estimates, based on regulations so far issued restricting the uses of tin plate, have indicated that the country's military and civilian requirements for 1943 could not possibly be met unless plating methods were developed on a large scale to yield usable plate with considerably less than 1.25 pounds of coating, approximately the minimum which can be satisfactorily applied by the conventional hot-dip process.

Electrolytic tin plate with 0.5-pound of coating comes closest to meeting the fundamental requirements. Where in other respects the electrolytically tinned product is a satisfactory substitute for hot-dipped tin plate, it is expected to effect a saving of two-thirds of the tin which would otherwise be required to produce the same amount of plate.

A line running only 300 feet per minute for 20 turns per week (160-hours) would save about 1000 tons of tin per year, it is estimated. Actually, all the new lines have top speeds of at least 500 feet per minute, with some even contemplating speeds as high as 1300 feet per minute. On the basis of 0.5-pound coating, the individual lines now being built will, therefore, each have outputs ranging from 750,000 to 1,500,000 boxes per year. With 26 of these lines to be in service within the next few months and running certainly faster than half speed, some idea can be obtained of the importance of the new process and the part it is likely to play in the solution of the critical tin shortage.

The Reliance Electric & Engineering Co., Cleveland, supplied the electrical equipment for several of the new lines recently completed, and for many of the remaining lines still under construction. In fact, Reliance engineers pioneered the synchronization and control methods which are being used for these lines. They made the first application of them to an electrolytic tin plating line installed at the Gary tin mill of Carnegie-Illinois about six years ago. A considerable amount of experimental work was done with this line in the intervening period and over 3,000,000 boxes of plate, used in dry packs and as can ends in experimental wet packs, have been successfully produced to date.

Four other companies, Clark Controller Co., Cleveland; Electric Products Co., Cleveland; Hanson-Van Winkle-Munning Co., Matawan, N. J.; Electric Machinery Mfg. Co., Minneapolis; and the International Telephone & Telegraph Corp., New York; have been associated with Reliance Electric & Engineering in the development of various phases of the work.

room with generator sets at right

Right—Fusion unit, drive bridle and part of oil emulsion unit

The electrolytic tinning line is essentially a continuous process which takes the tin plate in coil form from the cold rolling mills and after side trimming, cleaning and pickling, deposits tin on the strip electrically. Low-voltage generators (or rectifiers) supply direct current for depositing the tin on the steel from a cast-tin anode.

Like the continuous rolling mill, the continuous electrotinning line must deliver a quality product at a relatively high speed and with a minimum of interruptions for adjustment or repair of equipment. One of the most important considerations is the accurate relationship which has to be established and maintained between the current density used in the plating bath and the speed with which the material is moved through it. Furthermore, to obtain the maximum production out of the equipment, it has been found that this speed must be maintained uniformly and at as high a value as is consistent with the handling of the product. These requirements have presented interesting problems from the standpoint of the synchronization and control of the many drives operating in tandem. All of the lines are using variable-voltage control for acceleration and speed control, and most of them require a rather complex current density control in terms of lineal speeds.

In a typical installation, the strip enters the tinning line from one or the other of two uncoilers which are used alternately. The operation of the line is expected to be such that when a new coil is welded on to the trailing end of a preceding coil, the line is first slowed down to a point which represents the highest speed (in the neighborhood of 75 to 150 feet per minute) that can be maintained and still have the weld completed before the entire storage is removed from the loop.

In addition to the two uncoilers, the line includes the following units: seam welder, loop pit, roller guide, pin hole detector, gage rolls, drag bridle rolls, electrolytic pickler, multi-compartment plating tank, tin recovery system, steam dryer, reflow unit, drive bridle, weld cutout shear, roller leveler-flying shear, off-weight piler, branner, and final pilers.

The line operates in synchronism from 50 to 600 feet per minute by voltage control (50 feet per minute for setup purposes) and field control.

Speed Is Controlled

The main drive bridle is the master motor and its speed is under the control of a speed regulator operating on a motor-operated rheostat and itself having a vernier speed control. The center portion of the line between the entry drag bridle and the main drive bridle has the strip under tension. The tension at the entry drag bridle is under the control of a tension regulator. Since the speed range of the line is partially by voltage and partially by field control, this tension regulator for the entry drag bridle operates on a small 125-volt booster, so that irrespective of whether the line is operating on voltage control or field control, current in the armature of the entry drag bridle will indicate the same back tension.

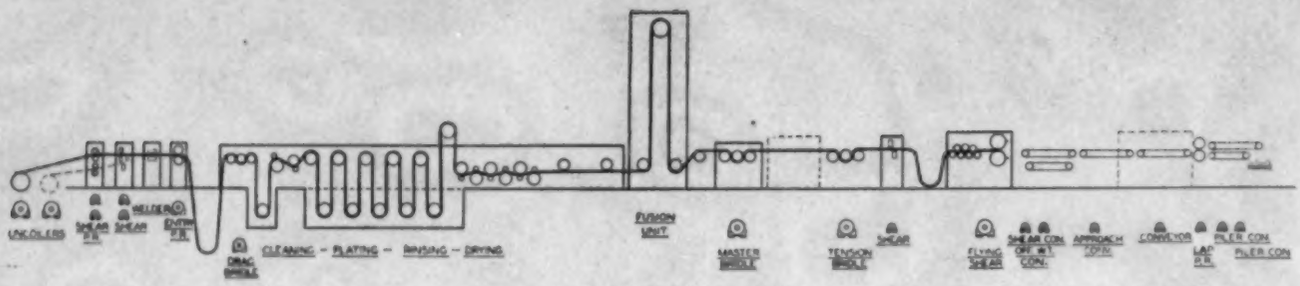
The motor-operated rheostat, which controls the speed of the main drive bridle by voltage and field, actually controls the voltage of the generator to give voltage control and controls also the 5-kilowatt 175-volt counter EMF exciter. This counter EMF exciter will control the field strength to the main drive bridle, the flying shear motor and the lapping conveyor motors.

The matching of the entry pinch roll motor with the main drive bridle motor is of importance since this entry pinch roll must be able to overspeed the rest of the line to accumulate a loop in the pit. The tension between the uncoiler drag unit and the entry pinch roll is only of sufficient magnitude to prevent the coil from unwinding and to assist in decelerating the coil when the line is decelerated.

Tension regulators are being used to avoid the use of rider roll rheostats and to relieve the operator of any particular attention to this point. Each of these uncoiler drag units will pump into its own 250-volt 5-kilowatt generator whose field will be changed in proportion to the line speed.

The piler lapping pinch rolls must operate in synchronism with the flying shear to maintain good lapping for good piling. Flying shear and lapping pinch rolls therefore, are served by the same generator. Likewise, the lapping conveyors must match the flying shear motor characteristics, since these conveyors are carrying the sheets which have been satisfactorily lapped over each other for good piling, and for successful piling the degree of lapping is important. When necessary the operator can make vernier adjustments at this end of the line.

The branner drive and the two conveyors immediately preceding it are on their own separate generator. This is done since the action of a branner is not



Typical arrangement of equipment for electrolytic tinning line where reflow process (fusion unit) is part of one continuous operation

satisfactory at low speeds. The branner will actually run over a speed range of much narrower proportions than is true of the rest of the line. In fact, it is expected that the branner will never run below 100 feet per minute and in general its entire speed range will be covered by voltage control with a vernier field rheostat merely for setup purposes.

The current for the conductor rolls in the electrolytic bath is supplied from low-voltage generators or rectifiers. Because the amount of plating put on the strip is dependent upon time and current, an intricate and accurate current control system has had to be worked out to maintain the current density proportionate to speed.

A special galvanometer-operated instrument is used to control the field of the plating exciter. The instrument will have a "bridge circuit" in connection with a tachometer driven by the main drive bridle to obtain this interrelationship of plating current and speed. However, it has been arranged so that the value of current can be changed arbitrarily for any line speed to compensate for thickness of coating desired or width of strip being plated.

Three of the electrotinning lines Reliance is equipping will use selenium rectifiers to supply the low-voltage, high-current plating requirements. Each rectifier bank has its own saturable core reactor for voltage control (20 to 1), and its own motor-driven blower for air circulation. The rectifier plates themselves are immersed in transformer oil and arranged in racks in a sheet metal enclosure. Each bank is equipped with thermoguards which operate in case of overheating.

Selenium rectifiers, while new in the United States, are old in Europe where some installations have been in successful operation for as long as 15 years. A 20,000-ampere plating unit has been in service for four years in England on a continuous 24-hour basis with no loss in efficiency to date.

Electrolytic tinning line installed by the Bethlehem Steel Corp. at its Sparrows Point, Md. plant differs from some of the others in several particulars. The strip is rerolled in coil form after plating, instead of being sheared into squares. The electrolyte used is alkaline instead of acid. The reflow process is a separate operation which is performed separately. Moreover, the plating section of the line—the center section—is kept running at a constant speed without the necessity of accelerating or decelerating during the making of the weld and the cutout of the previous weld.

Storage Is Provided

Strip in coil form is pulled from one of two uncoilers through the welder by the entry pinch roll. Following this entry pinch roll and preceding the tanks is a looper, or accumulator, that provides storage of strip. This storage is available while the center portion of the line continues to run with the entry and stopped to weld the leading end of a new coil to the trailing end of the preceding one.

Similarly, at the delivery end of the line, there is a looper in which strip can be stored while the center portion of the line continues to run and the recoiler is stopped to change coils. Both the entry and delivery loopers automatically control themselves so as always to be in readiness for the stopping of the entry or the delivery ends of the lines.

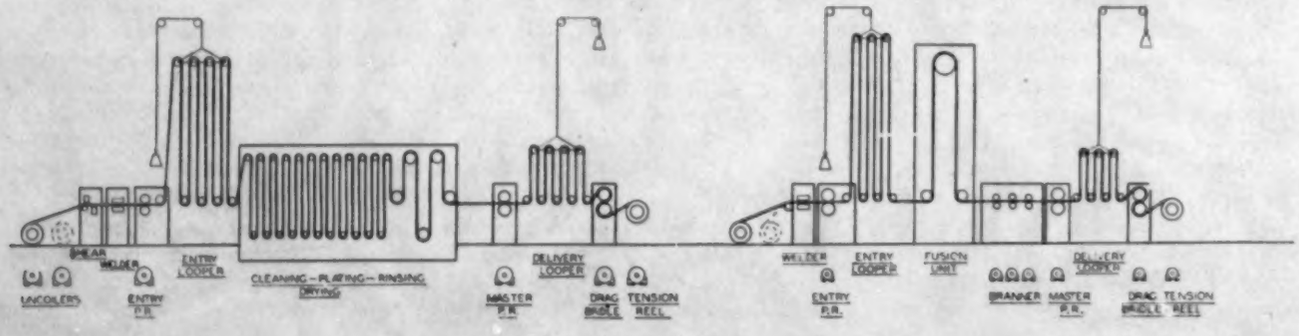
All of the electrolytic tinning lines that are being installed now will in all likelihood include some type or reflow unit as part of the operation. Those being built along the specifications developed by the Crown Cork & Seal Co., Baltimore, have reflow units as separate lines with generally two reflow lines for each tinning line.

The reflow or brightening process is almost identical in operation with the tinning line itself. Differences are in speed of operation and the fact that there is a vertical heat muffle instead of an horizontal electrolyte tank. Individual elements are the same—entry pinch roll, entry loop, main pinch roll, delivery loop, drag unit and recoiler, variable-voltage generator sets, etc. The tin plate goes through in strip form and is rewound in coil form.

On both the electrolytic tinning and reflow lines, speed control and current or heat control with respect to speed are vital factors and must be handled accurately by a regulator control of special design.

All of the new electrotinning lines will handle a continuous strip of about 31 gage in widths up to 36 inches. Initial speeds will range all the way from 200 feet per minute up to 650 feet per minute. Higher speeds are possible; in fact, the new lines in their initial tryouts have all easily reached a speed appreciably above the intended maximum, producing usable plate.

In this line loopers (accumulators) at entry and delivery ends provide enough stock to keep line going without interruption or slowdown for attaching or detaching new coils. Reflow process is set up as a separate line



When ignorance is blistered!

● It's the ignorant men who make costly mistakes. Trained men don't get hurt by small fires. Trained fire-fighters don't let little blazes grow into big ones.

The way to train workers in fire extinguishing is by demonstrating use of extinguishing equipment. Show how to handle real fires. Show how various types of extinguishers are handled on different kinds of fires.

Walter Kidde & Company has prepared a booklet—"How To Teach Fire-Fighting." It tells how to stage a fast-moving, interesting, instructive fire class. Write for your plant's copy.

Walter Kidde & Company, Inc.
747 Main Street **Belleville, N. J.**

Kidde PROTECTS LIVES

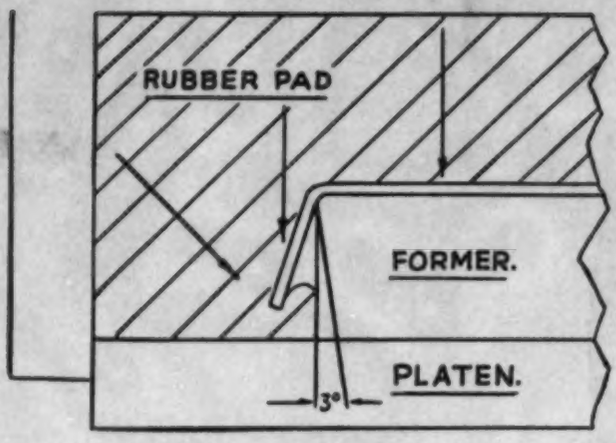
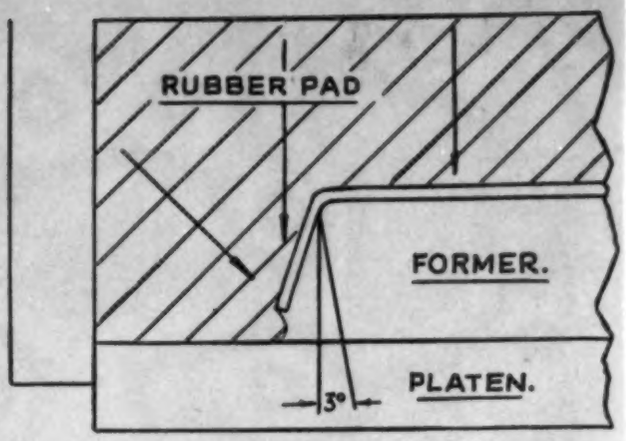


Fig. 1. (Left)—Diagram to illustrate how too soft a rubber prevents the flange from reaching the die because the rubber flows back in behind the flange.



Right, correct hardness is illustrated here. Less mobility of the rubber here allows flange to reach die. Note 3-degree backing off to correct for springback when pressure is released

PROPERTIES OF RUBBER

as used in

METAL DRAWING and PRESSING

By L. J. BROWN
Avon Rubber Co. Ltd.

RUBBER, as a medium by which metal sheet may be formed, is now, after some years of experience, firmly established. During the last few years, many articles have been written around the whole process, but these articles focus somewhat sharply upon the "mental" side of the job.

It is hoped to give here some new lines of thought and the extension of existing ideas, put in practical language and concentrated upon the *rubber* aspect. References will be made to the mechanical side, but let it be remembered that the target is "rubber". This article is written by a man in the manufacturing rubber trade who has been technically interested in this process since its earliest days.

All too often in the past the actual press operator or engineer has not been the man who came into direct contact with the rubber trade and such technical assistance as it was eager to offer.

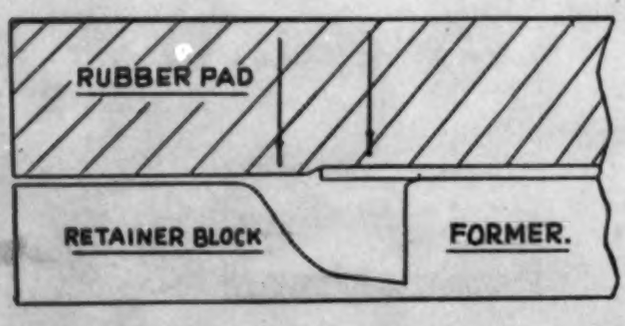
Thus an otherwise shrewd and energetic engineer or works manager, denied himself proper information and co-operation in the very heart of the process. Rubber is at least an equal partner in this process of drawing and pressing; the following remarks are, therefore, submitted as a collection of recorded observations to enable the metal worker to focus his attention on rubber in the operations of forming, drawing, blanking, piercing, flanging, bending and bulging.

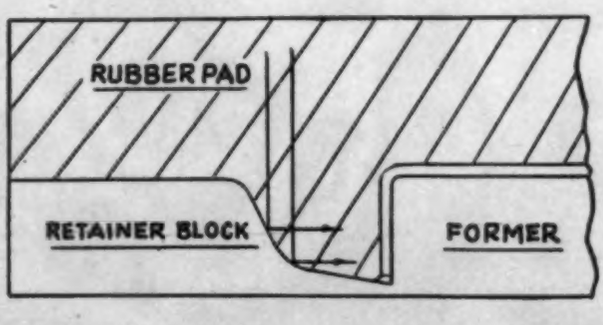
Today, rubber is a closely protected material in very short supply and every care must be taken to secure not only economical design, but the longest possible life from every ounce. The main usage, now under discussion, is concentrated in the aircraft manufacturing trade or similar essential types of work. However it is applicable to a wide variety of trades and articles other than aircraft construction. A small selection of articles would include metal ornaments, electrical trade pressings, household metal and hollow-ware, radio speaker chassis, cosmetic box novelties, engineers' special sundries and specialized toys.

The guiding principle will always be "economics". The prohibitive cost of original tools as compared with the number of articles for "run" is a governing factor; thus, if there are thousands of parts to be run, steel tools should be used; if there are only hundreds to be run the rubber matrix system is most

From *Sheet Metal Industries*, London.

Fig. 2—These diagrams illustrate flanging operations done with the aid of a pressure retainer block. Note arrows show direction of advancing pressure





FOR GREATER SPEED

AND BETTER RESULTS

IN PREPARING STEEL AND ALUMINUM

ORDNANCE PARTS

FOR VARNISH AND PAINT FINISHES

DEOXIDINE #170, admirably suited to the processing of steel shell cases, is but one of a number of grades of ACP acid cleaners. The immersion process in which it is used is adaptable to the cleaning of many other ordnance or marine parts. Other grades of DEOXIDINE are available for brush or spray processes where these are indicated for expediting production.

DEOXIDINE #170 is a chemical that removes light oil, annealing scale and eradicates rust and rusters, producing a clean, minutely-etched, paint-receptive surface. The rusters, even though invisible, are destroyed, eliminating the possibility of defects developing beneath the protective finish. DEOXIDINE does not produce a coating on the cleaned surface which on shell cases, for example, might crack in crimping and in obturation and ruin the protection of the final finish.

DEOXIDINE meets U.S. Ordnance Department requirements for its efficiency in removing rust and neutralizing rust producers before protective finishes are applied.

CHEMICALS ACP PROCESSES

Manufacturers of Inhibitors & Metal Working Chemicals

AMERICAN CHEMICAL PAINT CO.
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Send today for Deoxidine #170 Pamphlet showing how simple it is to use.

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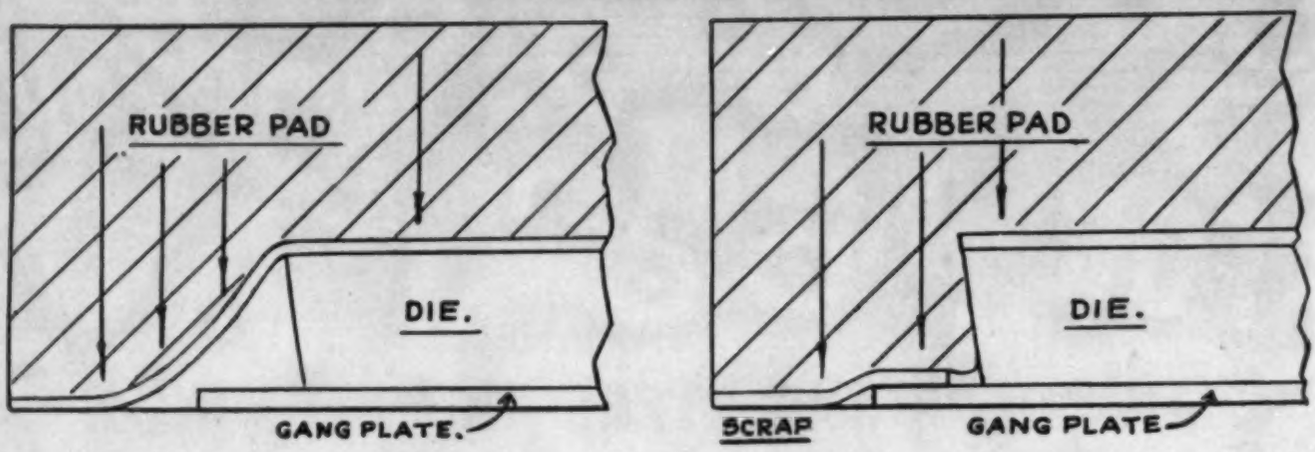

Fig. 3—Diagrams to illustrate blanking operation. Shearing edge and scrap are forced downward on the gang plate by the action

economical.

Another advantage is that where a tool must be experimental in design, or cannot be "fixed" in the early stages, then in steel this can be indeed expensive after all modifications or improvements have been carried out. The rubber process avoids a great deal of this cost. There are other features which need no discussion here.

All through this process "rubber" is but a term. It is better to start thinking of it early in these notes as "hydraulics"—a controlled fluid. Rubber will compress only to an extraordinarily small degree, but it will displace very readily, and, this displaceability varies according to the raw rubber content of the "mix" employed and the chemical compounding to which such a mix is subjected. Generally, tool-rubbers, as compounded, give a maximum compression value of 0.05 per cent per 100 pounds per square inch.

It is not, however, on this that the process depends, but rather on the *yield* range of the rubber. To make certain of securing a good general-purpose tool-rubber, the yield value, or to put it another way, the "elongation", is best selected around 500 per cent. Tool-rubbers will be shown later to be of much wider capabilities than hitherto used, but common practice has necessitated rubber companies fixing the elongation values for this class of work between 400 and 500 per cent.

A brief note might help here to say that the "hardness" of a rubber mixing runs in some ways closely with "elongation". A rubber mixing can be varied in its hardness according to its compounding recipe. Using raw or natural rubber as a base, various chemicals or powders can be milled in to give a very wide range of effects desired by the chemist. Thus a medium hard, tough rubber, with high tensile strength, undergoes a somewhat different compounding and processing as compared with a soft, yielding rubber, intended, maybe, for resistance to some corrosive acid or alkali. Chemical resistances and physical properties are each catered for —sometimes a combination of both is demanded.

The engineer using rubber in tooling processes should therefore remember that the trade can give him a very wide range of hardnesses or "yield" values if he decides he has a use for them, and such companies as cater for this class of work will see that he gets the best possible physical properties to suit his needs. Rubber for this work must be consistent in mixture, evenly vulcanized and possessing uniform elongation commensurate with the selected hardness. A badly handled rubber might have the right outward signs of hardness, but its behaviour under stresses might leave a lot to be desired. It could give uneven displacement and its surface could tend to break up quickly under work. Rubber is easy to deform and in the press-room this deformability is carefully controlled by the closure of the press platen and "box", also by the predetermined shape of the tools used.

It is vital that the rubber should possess maximum "recovery" value or elasticity of return. That means to say, that after deformation by the action of the press and tools employed, the rubber must, when pressure is released, return immediately to its original form or shape; in most cases, this will be a perfectly flat surface. Insufficiently vulcanized rubber lacks this vital elasticity and such a matrix would very quickly be in trouble and show excessive wear, bursts or permanent deformation. Rubber that is properly and evenly vulcanized (up to a certain hardness covering all press operations) will, when pressure is released, spring back from the shape it has been compelled to adopt, and its recovery capabilities must force it to recover its original shape and surface without any discoverable distortion remaining. This lasting distortion in such conditions is known as "permanent set", and absence of it makes long service runs possible without the rubber surface having to be renewed.

This length of run, of course, must depend on the nature of the work, the common-sense and capability of the pressman and the design of the tools.

To quote very rough figures, it is possible to run 20,000 duralumin parts on a reasonable forming operation without appreciable wear to the rubber surface. It will also be shown later how *lubricants* help not only in displacement of the medium and the metal, but also help to extend the life of the rubber and improve the work produced.

The rubber trade has been forced to hope that these pads and sheets would be carefully used; hardnesses in keeping with the demands of sheet metal workers were accordingly fixed around a rough general figure of 65 degrees Shore Durometer. This Shore Durometer is a testing gage for hardness used and accepted throughout rubber technology in this country as the most reliable and uniform method of judging comparative hardnesses. Thus, where some gages are good for soft materials, it will be found that their register curve is far too steep on hard qualities, whereas the Shore instrument gives an evenly rising curve on a graph consistent over the known range of manufactured hardnesses.

The instrument consists—in this form —of an indenter point of fixed length and penetration surface, arranged to spring into a special foot which very effectively minimizes the effect of "pressure" applied by the individual holder. Its effect is good from 15 to 100 degrees —all that is ever required in rubber— the higher figure being "gelatine" hardness. Many gages have been quoted over a period of years; even now, from time to time, new ones still appear,

(*Please turn to Page* 144)

"Take care of yourself, Dad"

Last year over 180 *million* man-*days* of productive time were lost through industrial accidents—many of them needless. Think how many tanks, ships, guns, planes those 180,000,000 man-days of work would have made! . . . Yes, dad—take care of yourself. Your soldier-son needs your factory production to win.

American Cable **TRU-LAY PREFORMED WIRE ROPE** is helping keep down accidents every day because it is a safer rope to use and handle. **TRU-LAY PREFORMED** resists kinking and snarling. It resists whipping; spools better. Worn, broken and chisel-sharp crown wires refuse to wicker out to jab workmen's hands. They remain in place, making **TRU-LAY** *much* safer to handle.

Use American Cable **TRU-LAY PREFORMED** for your next rope. Do everything possible to reduce lost-time accidents. America needs your full-time production.

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ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

INDUSTRIAL EQUIPMENT

Metal Saw

Johnson Mfg. Corp., Albion, Mich., reports a new model metal saw for high-speed cutting. Its improvements lie in the accessories which usually require servicing and maintenance.

Saw pump is non-clogging piston-type, driven by a noiseless cam. It is mounted

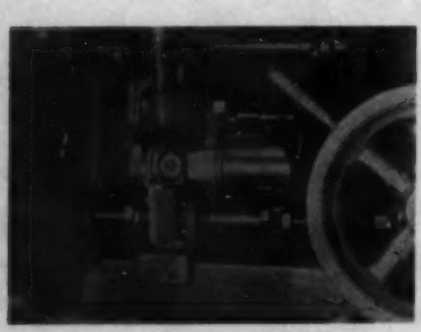
in the frame without impairing overall streamlining of machine. Power is taken from present drive gear, eliminating necessity of separate motor.

A power take-off eliminates special wiring and extra switches. Speed of pump is automatically regulated by speed of machine. Also flow of coolant is in direct relation to blade speed. Steady flow of coolant is insured through use of ram which smooths pump impulse. If dry cutting is desired, pump can be readily disconnected.

Quick-Opening Mechanism

Landis Machine Co., Waynesboro, Pa., announces a quick-opening mechanism for thread cutting die heads. It comprises a spring in combination with a latch, and latch block arrangement in addition to the conventional yoke employed to open and close the head.

In operation the yoke is employed to close and latch the head within itself. When the head is in the closed position, the yoke also locks independently of the



die head. As the yoke closes the head, spring tension is built up in an extension spring, one end of which is anchored to the machine bed and the other end of which is attached to the yoke.

As the threading operation progresses to the point where the die head is to be opened, a sleeve on the trip rod raises the latch from the latch block, thus releasing the yoke and permitting it to snap back quickly causing the head to open instantaneously.

The mechanism is fully adjustable for threads of different lengths by moving the latch operating sleeve on the trip rod and by moving the latch block bracket along the ways of the machine. Means also are provided to adjust the tension of the spring. The mechanism can be applied to Landis ⅜-inch single or double-head threading machines already in service.

Acid Siphon

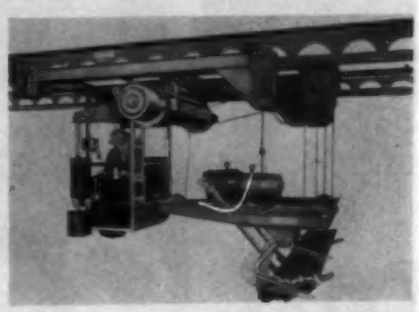
Pulmosan Safety Equipment Corp., 176 Johnson street, Brooklyn, N. Y., is introducing an acid siphon which dis-

charges acids and chemicals from carboys, drums and barrels. It consists of an acid-resistant casing inserted into carboy, flexible Saran plastic siphon tubing and positive flow control valve at pouring end. Simple pumping action of tubing inside casing, generates steady flow. The unit withstands sulfuric, nitric, hydrochloric (muriatic), sulfurous, glacial acetic, acetic acids, bleaching solutions and many other chemicals.

Pipe and Rod Carrier

Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O., reports a new motor-driven pipe and rod carrier which permits a cab operator to pick up 1600 pounds of stock in 12-foot lengths from the storage room, transport and set it in racks at fabricating machines, without any aid from floor men. Since it travels overhead, use of the unit eliminates need of aisles and makes possible the saving of considerable floor area.

An outstanding feature of this equipment is the safety with which loads can be moved swiftly above machines and men. Materials transported need not be in balance nor is it necessary for the operator to spend time in locating



the center of gravity of the load. The pickup fork assembly has a 3-point rope suspension from the carrier which gives it the necessary rigidity for handling loads that are far out of balance.

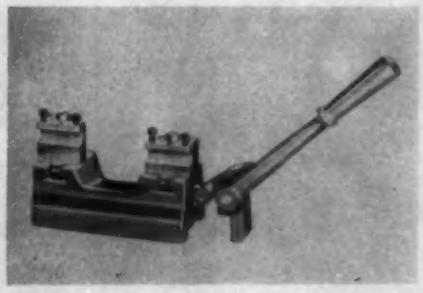
Another factor in providing stability is the double overhead track system on which the carrier travels. Rod and pipe are handled by two forks which are tilted upward when loading or downward when unloading by a motor-driven crank. A limit switch stops the forks automatically in the upward or holding position when the fork mechanism is not in operation.

The fork assembly can be raised or lowered as required. This unit has a lift of 8 feet but others can be furnished for lifts of 20 feet or more if required. Hoisting speed is 20 feet per minute and carrier travel speed is 300 feet per minute.

Cross Slide

Kessler Aero Tool Products Co., 211 West Palm avenue, Burbank, Calif., announces a new lever-operated cross-slide for performing both forming and cut-off work in a single operation.

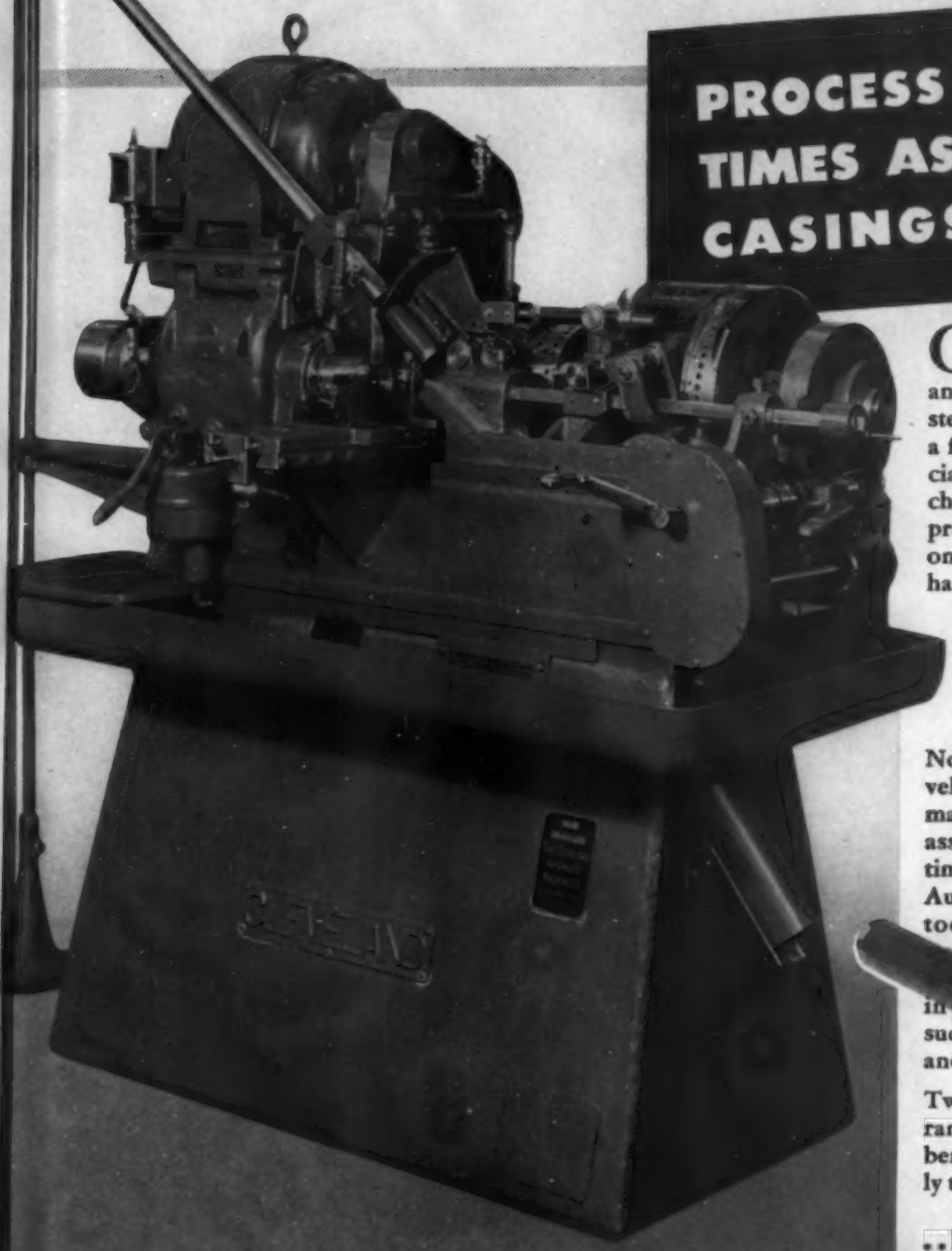
Designed for easy adaption to Atlas, Logan, 9-inch South Bend, Craftsman, and similar lathes, the double tool post



device operates without disturbing tool or carriage positions, according to the maker.

Conversion of engine lathe to production lathe, and vice versa can be effected

CLEVELAND 20-37 MM, 50 CALIBER AUTOMATIC SHELL MACHINES



PROCESS UP TO FOUR TIMES AS MANY STEEL CASINGS PER HOUR

Complete head turning on 20 and 37 millimeter and 50 caliber steel shell cases is accomplished in a fully automatic operation on specially tooled Cleveland shell machines. The actual hourly rate of production is a military secret, but on runs already made the output has been as high as four times that of the old method of processing. By the use of Tungsten Carbide tools, steel casings are machined at a turning speed and production rate close to that of brass.

Not an experimental or hastily developed device, the Cleveland shell machine is made up from standard assemblies of the extremely simple, time-tested Model B Single Spindle Automatic, adapted with special tooling, loading magazine and transfer mechanisms. The result is a degree of dependability unusual in production equipment providing such a vast improvement in method and output.

Two models handle the complete range from 20 millimeter to 50 caliber steel casings. Shipped completely tooled for immediate production.

..REASONABLE DELIVERIES

THE CLEVELAND AUTOMATIC MACHINE COMPANY

CLEVELAND, OHIO

SALES OFFICES:

CHICAGO: 20 North Wacker Drive, Civic Opera Building, Room 1408
DETROIT: 340 New Center Building · CINCINNATI: 1315 American Building
NEWARK: 902 American Insurance Building

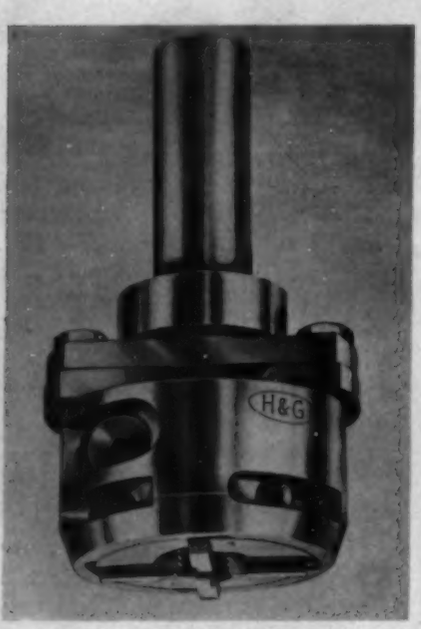
CLEVELAND *Single Spindle* AUTOMATICS

MODEL A—Built in 1⅛-inch to 9½-inch capacities
MODEL B—Built in 1⅛-inch to 2½-inch capacities

in a few moments, it is said, as the cross slide fits the dovetail on the lathe carriage. It is claimed that where already in use this new tool attachment saves as much as 75 per cent of the operator's time.

Adjustable Die Heads

Eastern Machine Screw Corp., New Haven, Conn., announces a new style SAML solid adjustable die head for use on all sizes of Brown & Sharpe automatic screw machines. It is complete with



holder and is provided with an alignment feature to take care of misalignment of turret and spindle.

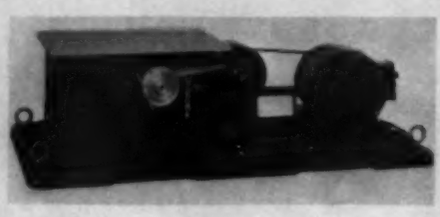
The same HG insert chasers are used in the head as those in the opening heads. The chasers are of high-speed steel, and will usually produce from four to ten times the number of pieces obtained from solid dies. Chasers are easily removable for regrinding, according to the company. The heads are adjustable for size and when once adjusted, hold that size.

Testing Machine

All American Tool & Mfg. Co., 1012 Fullerton Parkway, Chicago, announces the addition of a model 100 to its line of vibration fatigue testing machines. It is said to handle parts or assemblies up to 100 pounds, which are to undergo vibration fatigue tests. Table of the unit has an area of 15 x 18 inches and has 115 tapped holes for bolting on objects, besides being movable horizontally.

The frequency of the tester is adjustable while machine is running, from 10 to 60 cycles per second, 600 to 3600 vibrations per minute, and is recorded on an electric tachometer. Displacement, from 0 to 0.125-inch (adjustable) covers the full range encountered by parts subjected to vibration in actual service.

The unit is designed for use in lab-



oratories or inspection departments to test fabricated airframe and aircraft engine parts, navigation instruments, radio and electronic equipment, foundry cores to determine strength, packaging to determine resistance to vibration, and a variety of other parts.

Milling Cutters

Plan-O-Mill Corp., Hazel Park, Mich., announces a line of multiple-thread milling cutters in National, Whitworth, Acme, V, and special forms. These are offered either ground or unground, for use on any type thread milling machine.

Cutters are being offered with straight or spiral flutes, with or without special tooth for removal of imperfect thread. A complete range of sizes is offered.

Volt Reducer

Mosebach Electric & Supply Co., 1170 Arlington avenue, Pittsburgh, announces a new headlight volt reducer and holder socket, and a new mercury reversible headlight switch for use on mine locomotives. These are con-

structed to carry 275 volts direct current.

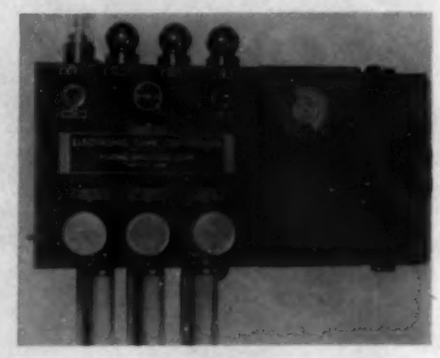
The rotary type mercury reversible headlight switch is equipped with a fuse that has a sufficient capacity for either or both headlights. When switch handle is in the forward position the switch operates the front headlight and when reversed it turns on the headlight on the rear of the locomotive. The headlight volt reducer socket is equipped with air-cooling fins, rubber bushing and packing nut.

Electronic Controller

Plating Process Corp., Holyoke, Mass., announces a new Master model electronic tank controller, consisting of a combination of the company's midget and standard models, for controlling all tank operations completely. The unit is equipped with an electric time clock, tank leakage and high level warning unit, three-position switch and colored light identification.

The tank leakage and high level warning is always "on duty" even though the instrument is shut off by the clock. The time dial of the clock is visible at the tank. The instrument clock is always running.

Unit has a power output socket in the instrument that is excited when the



switch at the clock compartment is on "clock" or "line". This makes provision for other instruments to operate automatically on the clock circuit. The instrument weighs about 15 pounds and is 16 inches long, 8 inches wide and 3 inches deep.

Gloss Measuring Unit

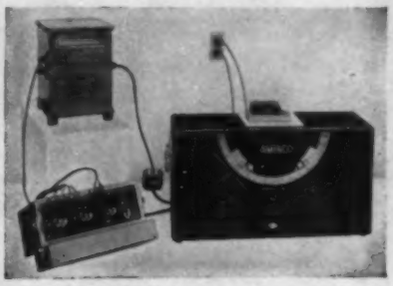
American Instrument Co., Silver Spring, Md., announces a new Amineo-Scott glossmeter which measures high, medium and low gloss of plane surfaces of materials over 2⅛ x 3 inches in size, such as paint finishes, enamels, lacquers, metals, etc. Results are in terms of the I.C.I. normal observer and I.C.I. illuminant C.

According to the company, the kinds of gloss measured with this instrument are specular gloss, contrast gloss, distinctness-of-image gloss, absence-of-bloom gloss, and many other optical properties of surfaces of all kinds. It is especially useful for ASTM method D523 for measuring specular gloss of paint finishes. Some suggested supplementary uses are the measurement of the hiding power of deposited finishes,

cleansing power of soaps and detergents.

Illumination is adjustable from minus 30 degrees to plus 70 degrees from the normal. The receptor is adjustable from plus 30 degrees to minus 70 degrees from the normal. Angles may be read to 1 minute of arc.

Measurements are made rapidly. The instrument has sufficient sensitivity and



wide range to measure relative apparent reflectance from high gloss to flat gloss without the use of neutral filters, wedges, or similar devices which are difficult to reproduce or calibrate. It operates on 110 to 120 volts 60 cycles (controlled frequency) single-phase alternating current, and is unaffected by fluctuations in line voltage. It need not be operated in a darkened room.

The glossmeter consists essentially of four main components: Goniophotometer; reference plate and sample holder; control and measuring unit; and galvanometer.

Power Gun

Cherry Rivet Co., 231 Winston street, Los Angeles, is offering a new G15 power rivet gun designed for high speed appli-

cation of blind rivets in double surfaced structures where access to one side of the work is obstructed.

An all-pneumatic gun, the G15 is reported to be a great improvement over previous pneumatic-hydraulic types. Its design is simplified—leaving fewer parts in the power linkage. Cast aluminum, steel, and bronze are used in its con-

Ingenious materials handling developments,

revealing unlimited possibilities

for boosting operating efficiency and lowering costs,

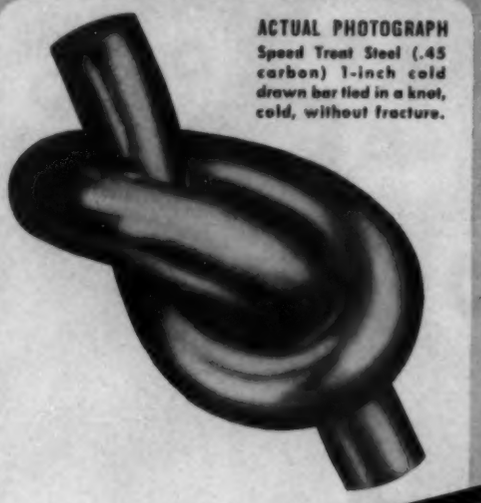
grow out of the all-'round

adaptability of **TOWMOTOR**

THE 24-HOUR ONE-MAN-GANG

TOWMOTOR CORPORATION • 1223 E. 152ND STREET, CLEVELAND

STRAIGHT—GAS POWERED INDUSTRIAL TRUCKS EXCLUSIVELY—SINCE 1919



ACTUAL PHOTOGRAPH
Speed Treat Steel (.45 carbon) 1-inch cold drawn bar tied in a knot, cold, without fracture.

SPEED TREAT STEEL
A MEDIUM HIGH CARBON OPEN HEARTH PRODUCT

ONE *Steel that gives you . . .*

1. Excellent *machinability*
2. Greatly extended *tool life*
3. Good *finished* parts
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6. Good *torsional* values
7. Minimum *distortion*
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struction. Hose connections of the unit are for ¼-inch lines. Its overall height is 10⅝ inches with maximum diameter of 3⅞ inches. The gun weighs approximately 4½ pounds.

Car Door Opener

Industrial Products Co., 2820 North Fourth street, Philadelphia, announces a new box-car door opener, said to be quick, safe and easy to use, and requires only one man to open or close any box-

car door. It weighs 15 pounds, and eliminates strained muscles, dangerous slips and falls, mashed fingers and other personal injuries. The tool is built for the rough handling to which it is naturally subjected in freight yards and on shipping platforms.

Enclosed Motors

General Electric Co., Schenectady, N. Y., announces a new line of totally enclosed motors, the most recent addition to its group of Tri-Clad motors. Available in both the polyphase, 60-cycle, induction type and the single-phase, 60-cycle, capacitor type, the new motors are designed for use under conditions where abrasives, chemicals, rain, snow and excessive dirt are encountered.

Units are furnished in frame sizes 203 to 225—including ½, ¾, and 1-horsepower at 900 revolutions per minute; ¾, 1, and 1½-horsepower at 1200 revolutions per minute; 1, 1½, and 2-horsepower at 1800 revolutions per minute; and 1½ and 2-horsepower at 3600 revolutions per minute.

Single-phase motors are furnished in frame sizes 203 and 204, and include ¾-horsepower at 1200 revolutions per minute; 1 and 1½-horsepower at 1800 revolutions per minute; and 1½ and 2-horsepower at 3600 revolutions per minute.

The mounting dimensions of these motors are interchangeable with Tri-Clad open motors of the same rating. They embody all important basic features of the Tri-Clad group. In addition, all parts of the motor enclosures—frame, end shields, and conduit boxes—are cast iron. Also, the leads are permanently encased in compound in a cast-in pocket in the stator frame.

Alloy Sprayer

(*Concluded from Page* 116)

found that a more perfect tinning occurs with the base metal when the surface is entirely free from oxides.

Cleaning of the surface can be done either with a flexible shaft grinder or power-driven wire brush. Sand blasting is not usually required except where the base metal cannot be heated properly. The surface of the base metal, when sand blasted, has sufficient under cut so that the sprayed metal will cling to it mechanically.

Galv-Weld metal, an alloy high in lead and thus relatively "noncritical," melts and is sprayed at about 500 degrees Fahr. It initially was introduced in stick form to be rubbed over the welded area immediately after the weld was completed and cleaned. Although widely used in this manner at the present time, spraying appears to have the advantage of speed where access to the work by the spraying equipment can be had. Speed of spraying will range from 50 lineal feet per minute upward for a corner or bead coating.

Stands 42-Hour Salt-Spray Test

Indication of the bond resulting from the use of the method is the accompanying photomicrograph which shows a coating of the metal sprayed on steel at 500 diameters. Since adhesion results even when the base metal is smooth, sprayed Galv-Weld appears to tin the base metal surface.

A sample of metal coated under the same conditions as in the photomicrograph but to a thickness of only 0.001-inch went 42 hours in a salt-spray test "before any indication of rust spots began to appear," according to the testing laboratory. This thickness is about the minimum that can be applied evenly and uniformly. Additional thickness up to about 0.004-inch is the customary for average requirements, though additional thicknesses required for exceptional needs can be had quickly by adjusting the control.

An interesting sidelight on the process is in connection with the spraying of galvanized work which has been burned. The coating of metal appears to adhere best on the burned area, thus assuring proper protective coating up to the galvanized area.

Since only low temperatures are required for bonding, there is no warping of the work and temper drawing does not occur. Moreover, considerable zinc is saved by the process which permits the regalvanizing of only those areas that were damaged or burned as compared with what would be required for regalvanizing the entire work if handled in the usual manner.

Total Load–475 Tons!

This battery of recently installed Car Hearth Annealing Furnaces has a combined load of *475 tons*—a whale of a lot of tonnage.

The furnace on the left is 18-feet wide, 16-feet high and 50-feet long; capacity, *200 tons.* The center installation is of equal length and capacity but it is only 16-feet wide and 12-feet high. The smaller furnace on the right has a capacity load of 75 tons and is 9¾-feet wide, 6-feet high and 27-feet long. All are equipped with modern temperature control and operating apparatus including chain-type car hauls.

Here, then, is an up-to-the-minute battery of R-S Furnaces that will play no small part in swinging the balance of production for Victory.

Write for details and illustrated Car Hearth Bulletin No. 68-F.

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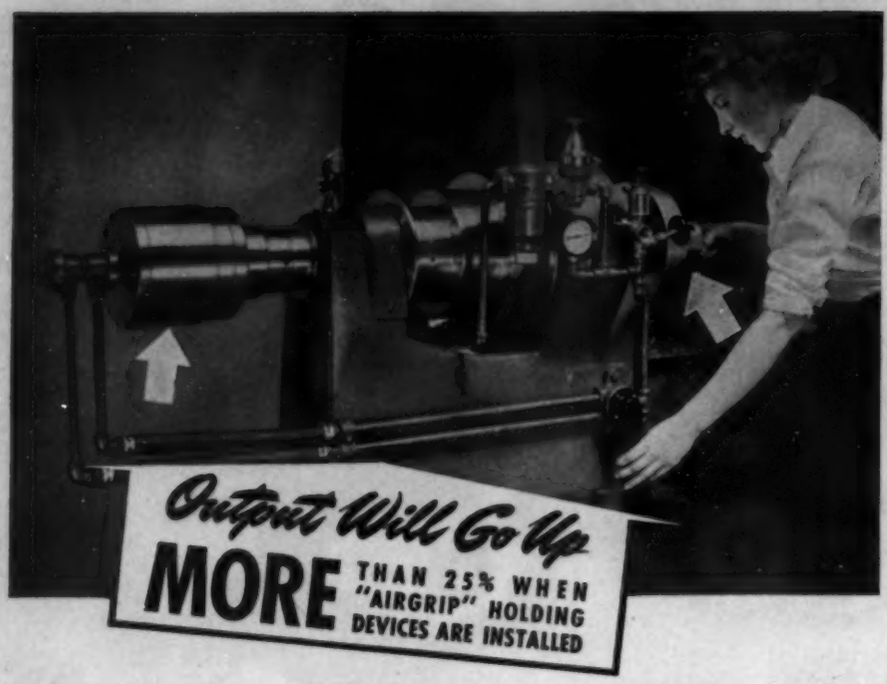

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"Airgrip" Chuck Division
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Planned Motor Drives

(*Continued from Page* 109)

current for the adjustable speed unit. Machine positions are rearranged from their location, as shown in Fig. 3, in order to group the direct-current drives so far as this is practical. The penalty of indirect routing of work in process is taken in lieu of running both direct-current and alternating-current power circuits to all parts of the plant.

The comparison of copper and steel requirements in the two instances includes the quantities of these metals used (1) in the distribution of power throughout the plant to constant speed and adjustable speed drives as shown in Fig. 5, and (2) in the manufacture of the respective adjustable speed drives as shown in Fig. 6. The copper and steel in the variable voltage control set and in the main motor generator set are included with the summation of those materials in the motors for the adjustable speed drives used in the alternative arrangement of electrical equipment.

Fig. 7 shows the overall comparison of circuit requirements and adjustable speed drives combined. The copper and steel in the constant speed drives are not included since their quantities would be the same in both examples. It may be asked, "Why then, are the circuit requirements for these constant speed motors included? Are they not the same in both examples, too?"

TABLE I—Comparison of Copper Wiring* Required in Alternate Distribution Systems

(1) Using variable voltage drives—on 440-volt, 3-phase, a-c distribution	
—Rubber-covered cable—	100%
—Varnished cambric cable—	75%
(2) Using straight 230-volt d-c distribution	
—Rubber-covered cable—	165%
—Varnished cambric cable—	135%

*Rubber-covered cable for the variable voltage a-c. system is used as 100%.

The explanation is that in the one case the alternating-current circuits serve all drives, and the bus sizes take into account the diversity of those factors permitted by having all drives superimposed on one distribution system. In the second case, the alternating-current circuit buses must be figured with less diversity—in other words at a higher load factor.

Reducing the comparison to specific quantities, it will be found that for every 5 tons of copper that would be needed for a plant similar to that illustrated in Fig. 4, using direct-current field-control adjustable-speed drives, only 3 tons of copper are required by introducing the variable voltage system shown in Fig. 3.

Similarly, for every 17 tons of steel

required for the system shown in Fig. 4, only 12 tons of steel are needed for the system illustrated in Fig. 3. In other words, 2 tons of copper and 5 tons of steel can be saved in this single example by the use of an all-electric adjustable-speed drive.

The conservation of copper and steel in electrical equipment can frequently be helped along by machine design engineers also. This was demonstrated recently when the choice of electric drives was under consideration for the tank turret boring mills built by the Fisher Body Division of General Motors Corp. and others.

The first approach to the problem was from the direction of power supply. If adjustable speed drives could be arranged through the use of alternating-current power distributed directly to each boring mill, the same feeders could supply alternating-current constant speed motors for the small auxiliaries and other machines driven with alternating-current constant speed motors throughout the same plant area.

On the other hand, the use of adjustable speed drives requiring the distribution of direct-current power from central converting sets to the several mills would make it necessary to run parallel alternating-current distribution circuits to serve the constant speed motors, or use direct-current motors with their correspondingly higher copper content for the constant speed applications.

TABLE II—Comparison of Copper Required for the Drives, Motors and Controls of Alternate Types of D-C Drives

Variable Voltage a-c System		d-c System	
d-c Motors Generators Exciter a-c Motors	1322 lbs.	Motors Controls plus Motor-generator sets*	1390 lbs.
plus Transformers and substations			

*Weight of copper in these sets will exceed that in transformers and substation by 10%.

The decision was to use the variable-voltage drive for adjustable speed application on the mills and to supply each mill with its own alternating current to direct-current variable-voltage control set so as to make possible distribution of electric power over a single 3-phase alternating-current system to the several mill locations.

Suppose a typical example is taken on which to base an analysis of the savings in copper and steel, a plant with an installation of 20 of these boring mills.

The adjustable speed drive requirements are one 40-horsepower main motor and two 5-horsepower auxiliary motors on each boring mill, all having a minimum speed range requirement of 6 to 1.

Power distribution for each system has required for the system shown in Fig. 4, only 12 tons of steel are needed for the system illustrated in Fig. 3. In other words, 2 tons of copper and 5 tons of steel can be saved in this single example by the use of an all-electric adjustable-speed drive.

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been laid out from a point of incoming power located just outside of the plant about midway along one wall and also, for both systems, from a point of power supply at the center of the plant.

Size of copper wire to serve the several motors is based on 125 per cent of full load current rating with a diversity factor of 1.0 for branch feeders supplying three machines; of 0.9 for branch feeders supplying four machines; and 0.8 for main feeders to branches serving six machines.

For all practical purposes, the amount of copper saved will be that resulting from the 3-phase alternating current distribution to the variable voltage drives for operation on 440 volts alternating current instead of 230 volts direct current. There is also some saving in copper in the drive equipment required in the variable voltage system over that used in an ordinary straight direct-current system.

For a direct-current system, when large motor-generator sets or converters are used to change the primary power from alternating current to 230-volts direct current, the copper in those machines will constitute an additional burden only partially offset by the copper required in transformers and substation equipment for an alternating-current distribution system.

Tables Give Comparisons

In Table I is shown comparison of the copper wiring involved in the two systems. Rubber covered cable used with a variable voltage alternating-current system is made the basis of comparison and considered as 100 per cent.

In Table II a comparison is made of the copper required for the drives, motors, and controls of: (1) The variable voltage alternating-current system, and (2) the straight direct-current system, using direct-current field control adjustable speed motors.

In a direct-current distribution system, if motor-generator sets are used in converting from primary alternating current, the weight of copper in these sets can be considered as roughly 10 per cent *more* than the copper in transformers and substations of the alternating-current distribution setup.

In plants with several smaller machines, driven by constant speed alternating-current motors located in the same area with machines driven by adjustable speed direct-current motors, the circuits to the constant speed units can be taken from the same alternating-current distribution lines. The increase in size of cables required by superimposing the two loads onto one system will not, however, be directly proportional to the added equipment involved be-

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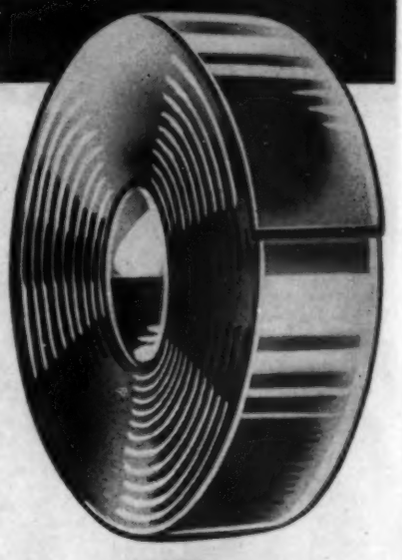

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cause a new diversity load factor can be taken into account.

On the other hand, if the adjustable speed drives are supplied from a direct-current distribution system, an entirely separate alternating-current distribution system must parallel it. Under such circumstances, a *higher* load factor has to be used in determining the copper requirements due to there being less diversity.

The critical shortages of copper and steel which the country must face in the next 12 months make it imperative that industry do all it possibly can to aid in the conservation of these strategic materials of war. Existing plant layouts as well as proposed new plant layouts should be re-examined to determine the extent to which a modification in the choice of electrical equipment can or could be made to achieve savings in the quantities of these metals required.

Making 90-MM Guns

(*Concluded from Page* 114)

as possible, in groups. There are 93 parts requiring this final inspection.

Visiting the department, the first inspection I came upon was that of the breech ring, now unloaded from its dolly and placed in a gaging fixture of special design on the surface plate of a table. This gaging fixture places the breech ring so that the gaging surfaces are parallel to the reference of the surface plate of the table. This has greatly facilitated the use of square and height gages. Check of radii is very exacting. Rejections have been known because radii were improperly made or left off, even though the consideration might be as little as 0.002-inch.

Gun Has Delicate Mechanism

Another interesting inspection, using intricate gaging tools and fixtures designed in this plant, is that of the breech block cranks. This is a gaging operation of the concentricity of the spline hole in relation to the outside surfaces of the crank, the location of the pivot hole relative to the spline hole, the location of the two stop surfaces.

All precision machining is not to be found in aviation engine parts, or in the other seemingly more delicate machining of military *materiel*. The 90-millimeter gun is a precise mechanism. It is subject to great strain and stress, and yet, so delicate is its mechanism, it must be counted upon to maintain unusually fine tolerances which would not usually be expected of an engine so massive. Actual battle service in Tunisia has indicated how well the critical tooling for this gun has been handled.

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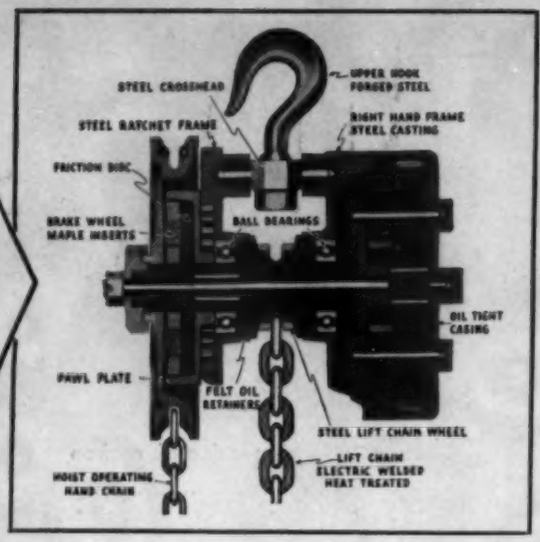

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Properties of Rubber

(*Continued from Page* 132)

but the rubber trade continues to use the Shore Durometer as it is the most reliable to adopt as a standard. Engineers would be wise to accept this method.

Rubbers can be made of soft gelatine-like texture to give a hardness reading of 15 to 20 degrees Shore, and so upward by degrees until an ebonite or vulcanite hardness of 95 to 100 degrees is reached.

For rough purposes the elongation figure varies commensurately with the hardness. Rubber can, accordingly, be arranged as is best suited to any particular job, but close co-operation with the pressman is essential as many features have to be taken into account. Thus a soft quality would displace very much more readily than one under pressure. It would be found, however, that although the soft rubber would reduce the working stresses in the early stages of an operation, yet the displacement might be too fast without exerting pressures at the right place *at the right time,* and the flow of metal would therefore be ruined.

Soft Rubber Flows Too Rapidly

Similarly, it might be found, as will be seen from the accompanying diagrams, that in certain circumstances the soft rubber might flow too rapidly down the face of a tool shape and so get behind the deformed or flanged portion before full closure had effected the ultimate deformation of the metal as required. Thus a rubber too soft would defeat its own purpose.

Conversely, a rubber too hard would tend to "bank up" and displace too slowly, and although the maximum pressures available were applied it can easily be seen that at fullest pressure of the ram complete closure would not be effected. There would still be spaces left in the confine, and the fluidity of the rubber—that most essential feature—would be lost. This could stop the press and blind experiments would cause serious damage to the rubber matrix. In the case of the heavy fixed "box" discussed this would mean a heavy outlay for repairs.

Can it reasonably be said that the press operators have yet found the full range of possibilities of rubber hardnesses? The two examples taken above are, of course, extremes, but they serve to illustrate what happens, without however being seen so clearly on the middle range of hardnesses such as are at present popular. Clearly, the engineer using a variety of shapes and forms must find some good general hardness

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which will form a mean to cover his likely requirements, but it is not quite to that man that these comments are made. To him the writer would be content to offer a reminder that it is not possible in this world, ever, to find a panacea for all ills and he must make up his own mind upon the range of work he can safely and successfully handle with one hardness pad. These remarks apply particularly to press forming operations where design of equipment does not permit much latitude, but suggestions will be made further on to show how this fixed hardness can in some circumstances be varied with advantage.

Another point worth stressing and not always fully appreciated is that the rubber pad process, permitting the use of soft metal dies, provides a valuable feature as follows. With steel dies such as are used on ordinary press work, aluminum and its grouped metals show a strong tendency to "pull". This produces "drag" lines on the finished work, and is caused by friction between the metal surfaces. This friction is excessive and the surfaces pull almost to the seizure point—only closely avoided by the metal of the tool scoring the light alloy and leaving unsightly marks on the finished work.

Drag Cannot Take Place

With the rubber pad process and a soft cast die, as is used, the metal itself is harder and drag cannot take place despite the fact that the inevitable displacement of the rubber under closure provides enough transmitted pressure to form the metal to the desired shape. It is to the last sentence that the press engineer should give further close attention—"enough transmitted pressure".

Unfortunately, it has been observed in the past that developed tooling on rubber has been along lines of sheer force, even though this fact may not necessarily have been entirely due to ignorance of the principles involved. Large powerful presses have been installed, in all too many cases much heavier than would have been necessary from the practical and "economics" points of view.

A parallel fact has been that because all this pressure was available, press operators have persisted in using unduly hard rubber. Formerly it was the fashion to err on the upper range and the margins obtained were extended by the brute force of a huge press which literally thrust everything before it. The rubber pad suffered to some extent, also the work and its scope; design of tools was more expensive and progress was slowed up as most people inclined to experiment followed the example of

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those who were happily looking around for yet heavier presses. In consequence free development of ideas on the whole subject has been restricted by financial conditions, and the small man has not been encouraged to share equally in the developments that correct use of rubber have made possible.

Processes Now Available: It may now be helpful to define the broad separation of processes available, in which rubber is already widely used.

The first is covered by the general term of *hydraulic presses.* Special features claimed for these are control of speed and force on the tool combining rapid approach during the idling stroke and the building up of pressure at the end of the power strike. The ability to "dwell" at the end of the power stroke reduces the amount of "creep back" which is experienced when cold working sheet metal. This, however, is usually taken care of in tool design by "backing off" the die blocks and a popular figure is 3 degrees, depending, of course, on the hardness of the metal. Four degrees is the usual maximum to take care of any likely spring back. Sketches accompanying this article illustrate this point. Hydraulic presses usually have platens up to 9 by 5 feet, although presses exist up to 15.5 by 8 feet.

As a subdivision comes the "smaller brother"—small presses using rubber matrices, but notably not hampered by the narrowing limitations of rubber vulcanized *in situ.* This group includes converted standard presses such as are found all over the country, also other types of presses in regard to which later note is made, and so on right down to conversions such as veneer presses, drive-on solid type presses, etc.

Next, and (in the author's opinion, at least) probably the most important of all, come *drop hammers,* or stamps.

The third process is *bulging rubbers,* where the rubber matrix in constant form is not used, but block shapes are employed for individual jobs. The main function of this process is hollow-ware, and ferrous metals are most frequently shaped by this means. This process is widely used, and it is customary to use total cover, split-halved dies to enclose the metal to be shaped, together with the rubber-former, usually a cylinder of predetermined volume.

The closure is by means of a ram to effect the displacement of the rubber into the locked halved dies. Under this heading also comes the type of local rubber packing used in conjunction with steel dies to help in deforming metal of any type, but usually mild steel or brass. A tubular example of this is the "sea mine horn" executed on a simple fly

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press. Concentrated deforming pressures are possible with these processes.

Finally, and only to receive short mention here, is a press practice of very different form, and only of indirect interest. This is not for sheet-metal work, but rather for shaped, plied materials, such as wood in various forms which may or may not include sheet metal in the assembly. It is a vacuum bag process where the parts are formed inside a standard rubber envelope with the aid of forming tools, and the process can include a low temperature heat treatment. The bag extends beyond the platens and is open along one edge only, being closed by means of special clamps. The bag is exhausted by means of a pump via a special built-in extension neck.

(Concluded Next Week)

New Product Removes Protective Coatings

Miccrostrip, a combination of solvents developed by Michigan Chrome & Chemical Co., 6340 East Jefferson avenue, Detroit, for the removal of protective coatings is reported to be especially useful for the removal of lacquer used to mask parts for hard chrome plating or for selective hardening.

According to the company, the product, within a few minutes, makes possible quick and easy removal of every trace of lacquer—even that which might have accumulated in small inside diameters or other hard to reach spots. Besides being non-toxic, it contains no acids, and will not affect any metal finish, it is said.

In addition to its use for masked parts, the development is effective for the removal of other coatings such as those used for the protection of plating racks.

New Rubber Heel Conducts Static Electricity

A rubber heel for such diversified workers as munitions makers which conducts electricity instead of insulating it was recently announced by Goodyear Tire & Rubber Co., Akron, O.

By means of a newly-developed rubber compound of which the heels are made, static electricity within a worker's body is carried off almost at time of inception.

With normal rubber heels, static electricity accumulates within a worker's body until it generates a spark strong enough to go through the heel.

Outwardly, the conductive heels are indistinguishable from conventional rubber heels with the exception of slightly more stiffness.

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Size	Amps.	Strands	O.D.	I.D.	Wt. in lbs. per M ft.
6	75	950	.400	.210	132
4	125	1029	.495	.275	202
3	150	1323	.500	.305	235
2	200	1666	.560	.335	295
1	250	2156	.625	.400	373
1/0	300	2646	.675	.440	450
2/0	375	3381	.750	.490	570
3/0	450	4284	.815	.545	705
4/0	550	5376	.900	.635	860

Let us tell you more of the "Story of MAJOR Cable". Learn why MAJOR Welding Cable leads in flexibility, quality of insulation and resistance to abrasion and oil. Read why "MAJOR" is superior to ordinary welding cable and is the welding cable best suited to your needs. We can usually ship from stock.

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SOUTH BEND LATHES

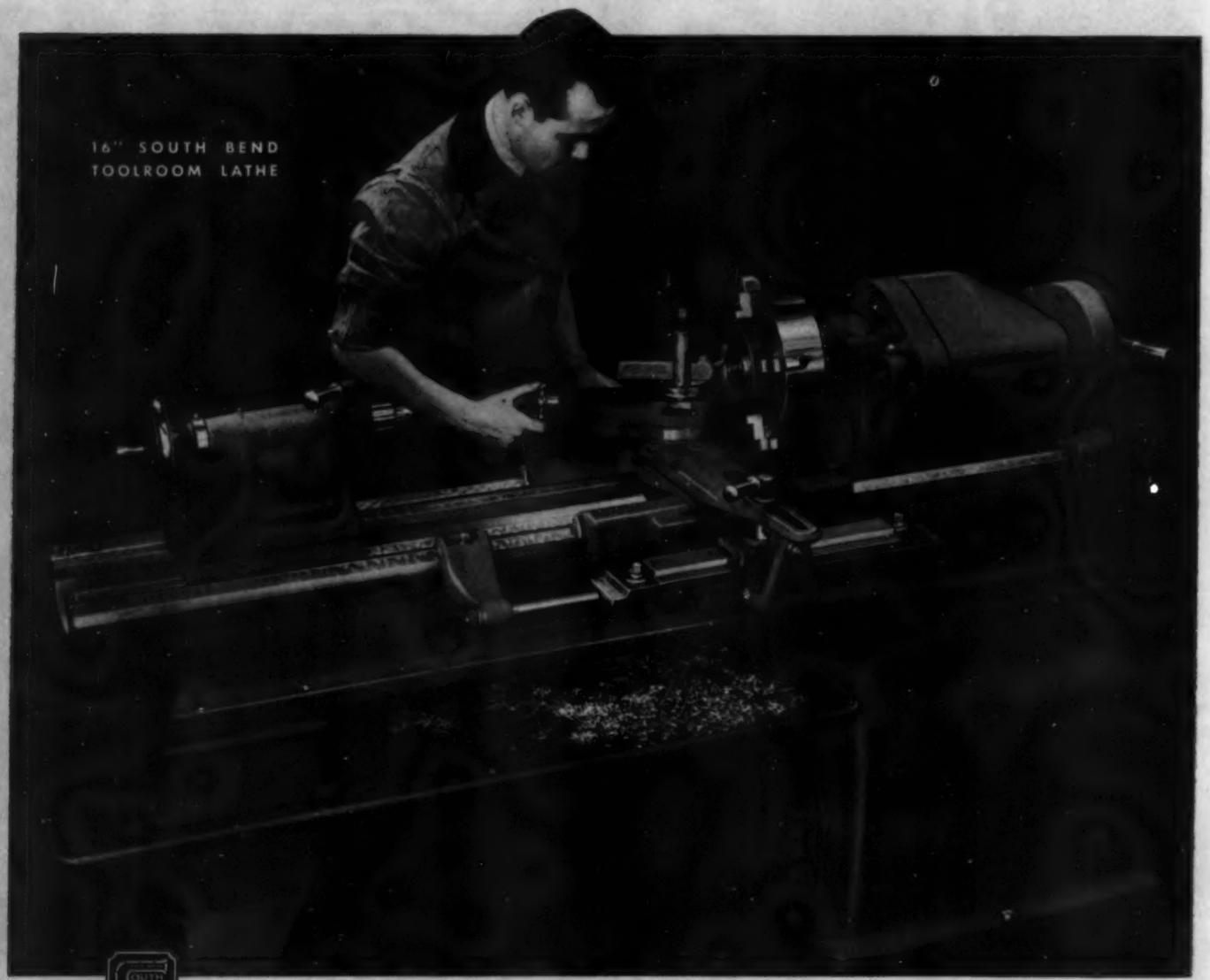
GIVE SKILLED MANPOWER MORE PRODUCING POWER

To give our fighting forces the increased striking power of more and better weapons, Industry's skilled manpower must have the increased producing power of fast, accurate tools.

BUY WAR BONDS

South Bend Lathes squarely meet this requirement. Their rigidity and wide range of spindle speeds permit taking full advantage of the higher cutting speeds that are possible with carbide and diamond tipped tools. Their precision makes it possible to finish turn and bore with such accuracy that subsequent grinding and honing operations can often be eliminated.

South Bend Engine Lathes and Toolroom Lathes are made in five sizes—9″ to 16″ swings. The Turret Lathes are made in two sizes—Series 900 and Series 1000. Write for a catalog.



SOUTH BEND LATHE WORKS

SOUTH BEND, INDIANA • LATHE BUILDERS FOR 36 YEARS

Hope for More Civilian Steel This Year Fades

War needs already cover nearly all year's capacity. . . Railroad requirements may be met by WPB. . . Plate output promises to set new record. . . All deliveries tighter

DEMAND

Bookings into next year.

PRODUCTION

Steady at 97 per cent.

PRICES

Premium allowed New England blast furnace.

HOPE that may have been entertained that additional steel would be available this year for civilian use has been extinguished by the heavy load imposed on mills for war purposes.

In spite of cutbacks and adjustments, which caused some cancellations, no capacity has been opened up for civilian steel and the gaps have been filled immediately by other war needs. Some plate mills now are booked solidly for the remainder of the year and indications are that by the end of July all will be. Navy specifications, after a slow start, have been placed in large volume for fourth quarter and also to some extent for first quarter. As orders are entered in the order of their receipt much of the Navy steel probably will be delivered late in the quarter. Construction programs will not be affected, as steel for a ship is specified usually five months in advance for cargo ships and the program for 20,000,000 tons of deadweight cargo ships for 1943 probably will be fully met.

Placing of 152 Liberty ships with a Maine shipyard will call for distribution of approximately 750,000 tons of plates, shapes and bars.

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Pressing need of railroads for steel to maintain rolling stock efficiency is being recognized and relief appears likely in fourth quarter to prevent breakdown of carrier service. Locomotives are most needed. Most motive power units now being built are for American forces abroad and for lend-lease, all at the expense of domestic needs.

Some estimates of plate production for 1943, based on first half performance and considering additional facilities which may be completed by fourth quarter, are set as high as 13,340,000 tons. This would compare with 11,543,000 tons made for sale in 1942. It does not appear likely that any steel will be diverted from plates to other products in the present readjustment and shipbuilding promises to continue its heavy demands. Some easing in plates for gasoline and rubber installations is possible.

Bar deliveries continue to tighten, both in carbon and alloy grades. Most producers of high-carbon material can offer little before November. Large rounds are available from many producers no sooner than December and a few mills can promise nothing before next year. Alloy bars are available in November but where special heat treatment is necessary shipments now fall into next year.

Principal disturbing factor in the steel and iron scrap market is the small aggregate tonnage reaching yards and inability of the latter to prepare it for shipment. Industrial scrap, handled directly to melters, is coming out in sufficient quantities for current needs, though in some instances reserve stocks are being cut into somewhat. Better disposition is being made of borings and turnings, with increased facilities for crushing. Heavy pressure for use of this material has resulted in a larger proportion being moved. In the East low phos scrap is in excess of demand, consumers having good stocks. Foundry grades are dull as gray iron foundries go on slower schedules.

• • •

Steelworks operations last week held steady at 97 per cent. A drop of 4 points to 93 per cent at Pittsburgh, caused by coal shortage, was balanced by numerous small advances at other points. Detroit also dropped, 2 points to 90 per cent. Chicago advanced 1½ points from a revised figure of 98 for the preceding week, to 99½, Wheeling 3 points to 90, Cleveland 1½ points to 94, Cincinnati 3 points to 92, St. Louis 2 points to 97, Buffalo 3 points to 93 and Youngstown 3 points to 97. Rates were unchanged at Birmingham, 95; New England 95; eastern Pennsylvania 93.

Office of Price Administration has granted relief to Mystic Iron Works, Everett, Mass., by allowing a second premium of $1 per ton over the ceiling on pig iron. This was in response to a request by Mystic, accompanied by a showing of increased costs for ore, labor and other factors.

Impact of the coal stoppage in June was partially responsible for a drop in finished steel shipments by United States Steel Corp. subsidiaries for that month. At 1,552,663 net tons June shipments were the lowest for any month since February, 1941. On daily average movement June made a loss of 5918 tons daily from the May average and 8515 tons daily from the average of June, 1942.

Composite average prices of steel and iron products remain steady at Office of Price Administration ceilings. Finished steel composite is $56.73, semifinished steel $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	July 17	July 10	July 3	One Month Ago June 1943	Three Months Ago April, 1943	One Year Ago July, 1942	Five Year Ago July, 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$58.00
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	36.60
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	19.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	13.30

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	July 17, 1943	June, 1943	April, 1943	July, 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.49	2.49	2.49
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55
Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron	July 17, 1943	June, 1943	April, 1943	July, 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.39	25.39	25.39
No. 2 fdry., del. Pitts., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2 fdry., del. Phila.	25.84	25.89	25.89	25.89
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.34	31.54	31.54	31.54
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	140.65	140.65
Scrap				
Heavy melting steel, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting, steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke				
Connellsville, furnace, ovens	$6.50	$6.50	$6.40	$6.00
Connellsville, foundry, ovens	7.75	7.75	7.50	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncropped, $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36; Duluth (bil.) $36.
(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40. Detroit, del. $42; Duluth, $42.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton and Follansbee Steel Corp. $49.50 at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section: 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over, $56. Add $1.75 del. Detroit; $2.75 del. Eastern Mich.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54; del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, Galveston, No. 5—9/32 in., inclusive, per 100 lbs., $2. Do., over 9/32—47/64-in., incl., $2.15.
Worcester add $0.10; Pacific Ports $0.50.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3": Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Mahoning Valley 2.22½c; Detroit, del. 2.25c; Eastern Mich. 2.30c; New York del. 2.49c; Phila. del. 2.47c; Gulf Ports, dock 2.52c; Pac. ports, dock 2.80c.
(Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c and Eckels Mfg. Co. 2.40c at established basing points. Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.35c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70c; Toledo 2.80c.
(Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City. New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.80c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.20c; Eastern Mich. 2.25c; Phila. del. 2.27c; New York del., 2.34c; Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.67c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific Ports 4.25c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage, base 2.75c; Granite City, base 2.85c; Detroit del. 2.85c; Eastern Mich. 2.90c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Detroit del. 3.45c; Eastern Mich. 3.50c; Pacific ports 4.00c.
Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	....
65	7.15c	7.90c	....
58	7.65c	8.40c	....
52	8.45c	9.20c	....
U.S.S., R.C. Grade 10.10		....	....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c;. Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg.
Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.
Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.45c; Eastern Mich. 3.50c; Worcester base 3.35c.
Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.
Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.
Tin Mill Black Plate, Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.
Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.
Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.
Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.29c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.45c.
(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. 2.20c, f.o.b. basing points.)
Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.
Wrought Iron Plates: Pittsburgh, 3.80c

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.27c; Phila., del., 2.215c; Gulf ports, 2.47c; Pacific ports, 2.75c.
(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)
Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.55; Pacific ports	3.05c
Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland	3.05c
Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland	3.40c
Woven fence, 15½ gage and heavier, per base column	.67

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70; single loop bale ties, column 59; fence posts, carloads, column 69.

Pipe, Tubes

Welded Pipe: Base price in carloads, threaded and coupled, to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	¼	24	3½
¼ & ⅜	59	40½	⅜	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	36	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-19	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.08	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	30.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c. Tie plates, $43 gross ton, base.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.
High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base. per lb.
18.00	4	1	....	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	‡‡18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. ** Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.
Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.
Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.
Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.
Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅝ and ¾ x 6-in. and shorter	63½ off
Do., ⅞ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

	U.S.S.	S.A.E.
Semifinished hex.	62	64
⅛-inch and less	59	60
⅛-1-inch	57	58
1¼-1½-inch	56	..
1⅝ and larger		

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*6.50
Connellsville, foundry	7.50- 8.00
Connellsville prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	7.25- 7.75
Wise county, furnace	6.75- 7.25

By-Product Foundry

Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943. †$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	26.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic*	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.53	26.03	27.53	27.03
Brooklyn, N. Y., del.	27.50	.....	.....	28.00
Birdsboro, Pa., base	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	.....	.....
Baltimore, del.	25.61	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	24.22	.....	.....	.....
Cincinnati, del.	24.06	22.60	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.15	.....	.....	.....
Philadelphia, del.	25.46	24.58	.....	.....
St. Louis, del.	24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.10	24.60	25.60	25.10
Muskegon, Mich., del.	27.19	.....	.....	27.19
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.39	24.89	25.89	25.39
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.31	25.81	26.81	26.31
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.63	26.13	27.13	26.63
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston, del.	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.44	24.61	.....	25.11
Neville Island, Pa., base	24.00	23.50	24.50	24.00
‡Pittsburgh, del. No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	25.99	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.84	25.34	.....	26.34
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	25.94	25.44	25.44	25.94
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese over 1.00%.

High Silicon, Silvery

6.00-6.50 per cent (base)....$29.50
6.51-7.00..$30.50 9.01- 9.50..$35.50
7.01-7.50.. 31.50 9.51-10.00.. 36.50
7.51-8.00.. 32.50 10.01-10.50.. 37.50
8.01-8.50.. 33.50 10.51-11.00.. 38.50
8.51-9.00.. 34.50 11.01-11.50.. 39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $28.00
Chicago, del. 31.34
(For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn..$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.. 33.00

Gray Forge

Neville Island, Pa. $23.50
Valley, base 23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.74, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00

Second Quality

Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00

Malleable Bung Brick

All bases $59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk..... 22.00
net ton, bags 26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $30.00-33.00
Do., barge 30.00-33.00
No. 2 lump 30.00-33.00
(Prices effective July 1, 1943.)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.33; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Electric Furnace Ferromanganese: 10.40c to 26.50c per lb. cont. Mn. Same zones and differentials as Silicomanganese.

Chromium Metal: Per lb contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochromium: Carloads f.o.b. shipping point, freight allowed; eastern zone, high-carbon standard, 13-14½c per lb. Cr. cont., according to crushed size; high-carbon S. M., 14-15½c; high-carbon high-nitro, 18-19½c; high-carbon foundry, 13½-14c; low-carbon standard, 10 grades, 19½ to 54c; low-carbon S. M., 20-49c; low-carbon high-nitro, 2c over low-carbon standard; chromium metal, 78½c to 99½c; central zone add .4c lb. for carloads, .65c for l.c.l. on ferrochromium, .15c. carloads, 2.5c l.c.l. on chromium metal; western zone add 1c for carloads, 1.85c, l.c.l. on ferrochromium, 2.75c carloads, 4.75c l.c.l. on chromium metal.

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Carloads, unpacked, Eastern zone, 25%, 9.75c to 12.15c lb. Si. contained; 50%, 6.65c to 8.10c; 60% 7.70c to 9c; 75% 8.05c to 9.05c; 85% 8.90c to 9.85c; 95% 11.05c to 12.45c, according to crushed size. Central zone add .15c to .80c lb. cont. Si., l.c.l. add .45c to 3.35c; Western zone add .6c to 2c, l.c.l. 9c to 11.05c. Prices F.O.B. shipping point, freight allowed to destination.

Silicon Metal: 96% Si. 2% Fe. max., 12.50c to 14.85c per lb.; 97% Si. 1% Fe., 12.90c to 16.25c per lb., according to crushed size, f.o.b. shipping point, freight allowed.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Same zones as ferrosilicon, eastern zone, 5.3c to 7c per lb.; central zone, add 1.4c to 1c per lb.; western zone, add 55.c to 3.05c per lb.

Standard Ferromanganese Briquets: 6.05c per lb. Same zones and differentials as Silicomanganese.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents up.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ¼-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.00c; ton lots 10.50c, less ton lots, 11.00c.

Borosil: 3 to 4% boron, 40 to 45% Si., $7 lb. cont Bo., f.o.b. Philo, O.

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (13 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[16]	4.744[16]	4.144[13]	4.715	7.762[25]	6.062[25]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[16]	4.613[16]	4.103[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[16]	4.613[16]	4.103[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[16]	4.872[16]	4.072[21]	4.772	7.566[25]	5.866[25]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[16]	4.052[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.198[17]	4.841[16]	4.041[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[16]	4.165[21]	.....	.....	.....
Bethlehem, Pa.*	.	3.45[1]	...	...	...	...	...	...	...	...	...	...	...
Claymont, Del.*	...	...	3.45[1]	...	...	...	...	...	...	...	...	...	...
Contesville, Pa.*	.	.	3.45[1]	...	...	...	...	...	...	...	...	...	...
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.73[15]	4.40[16]	3.75[21]	4.66	7.35[25]	5.65[25]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.81[1]	4.65[15]	4.30[16]	3.65[21]	4.35	7.35[25]	5.65[25]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[15]	4.40[24]	3.75[21]	....	7.45[25]	5.75[25]
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[15]	4.30[24]	3.65[21]	...	...	...
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[15]	4.40[24]	3.75[21]	4.45	7.556[25]	5.856[25]
Cleveland (country)	3.25[1]	.	3.30[1]	.	3.25[1]	3.50[1]	3.50[1]	.	4.30[24]	3.65[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[15]	4.500[24]	3.800[21]	4.659	7.680[25]	5.980[25]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[30]	5.443[24]	4.443[21]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[30]	..	..	...	...	...
Cincinnati	3.611[1]	3.691[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[15]	4.475[24]	4.011[21]	4.711	6.10	6.20
Youngstown, O.*	....	....	....	....	....	....	....	4.40[15]	....	....	....	....	....
Middletown, O.*	....	....	....	....	3.25[1]	3.50[1]	3.50[1]	4.65[15]	....	....	....	....	....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.75[21]	4.65	5.75[25]	5.85[25]
Chicago (country)	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.85[15]	4.10[24]	3.65[21]	4.55	5.75[25]	5.85[25]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[24]	3.887[21]	4.787	5.987[25]	6.087[25]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	3.98[21]	4.78	6.08[25]	6.18[25]
St. Paul	3.75[3]	3.80[3]	3.80[3]	5.40[3]	3.50[3]	3.85[3]	3.85[3]	5.00[3]	4.35[3]	4.34[21]	3.85	7.70[25]	6.00[25]
St. Louis	3.64[1]	3.69[1]	3.69[1]	5.29[1]	3.39[1]	3.74[1]	3.74[1]	4.99[16]	4.24[16]	4.02[21]	3.61	7.72[25]	6.02[25]
Memphis, Tenn.	3.90[3]	3.95[3]	3.95[3]	5.71[3]	3.85[3]	4.10[3]	4.10[3]	5.25[11]	4.66[16]	4.31[21]	....	..	.
Birmingham (city)	3.50[3]	3.55[3]	3.55[3]	5.83[3]	3.45[3]	3.70[3]	3.70[3]	4.75[16]	4.78[16]	4.43[21]	....	..	..
Birmingham (country)	3.40[3]	3.45[3]	3.45[3]	5.83[3]	3.35[3]	3.60[3]	3.60[3]	4.75[16]	4.78[16]	4.43[21]	.	....	..
New Orleans (city)	4.10[3]	3.90[3]	3.90[3]	5.85[3]	3.95[3]	4.20[3]	4.20[3]	5.25[26]	4.95[16]	4.60[21]	5.00	..	..
New Orleans (country)	4.00[3]	3.80[3]	3.80[3]	5.75[3]	3.85[3]	4.10[3]	4.10[3]	5.15[26]	4.95[16]	4.60[21]	..	..	..
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.75[3]	4.30[3]	4.30[3]	5.25[26]	5.43[16]	4.50[21]	....	..	..
Los Angeles	4.35[3]	4.60[3]	4.90[3]	7.15[3]	4.95[3]	4.90[3]	6.70[3]	5.95[16]	7.15[3]	5.70[21]	....	9.55[25]	8.55[25]
San Francisco (city)	3.95[3]	4.35[3]	4.65[3]	6.35[3]	4.55[3]	4.50[3]	4.50[3]	6.60[16]	7.55[16]	5.55[21]	..	9.80[3]	8.80[3]
San Francisco (country)	3.85[3]	4.25[3]	4.55[3]	6.25[3]	4.45[3]	4.40[3]	4.40[3]	6.50[16]	7.45[16]	5.45[21]	....	....	..
Tacoma	4.20[3]	4.45[3]	4.75[3]	6.50[3]	4.65[3]	4.25[3]	5.45[3]	5.70[3]	6.63[16]	5.75[21]	....	..	..
Seattle (city)	4.20[3]	4.45[3]	4.75[3]	6.50[3]	4.65[3]	4.35[3]	5.45[3]	5.70[3]	6.63[16]	5.75[21]	....	..	8.00[3]

*Basing point cities, with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in amendments Nos. 10 to 16 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base.

Ores

Lake Superior Iron Ore
Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore
Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore
Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore
(Equivalent OPA schedules):
Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.
(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (seller's nearest rail)	
48% 3:1	52.80
less $7 freight allowance	

Manganese Ore
Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.3c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	100.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Bars per 100 lb.	Basic open-hearth Billets per G T	Electric furnace Bars per 100 lb.	Electric furnace Billets per G T
	Chemical Composition Limits, Per Cent									
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	.	.
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8618	.12-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.18-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9253	.50-.60	.75-1.00	1.80-2.20	.....	.....	.....	.40	8.00	..	..
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.....	.65	13.00	....	.
NE 9415	.13-.18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.55	27.00
NE 9537	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.....	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.....	.....	.85	17.00	1.35	27.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

					ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES									
					Low Phos. Grades									
	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	Heavy Structural, Plate 2 ft. and less	Heavy Structural, Plate 1 ft. and less	Foundry Steel 3 ft. and less	Foundry Steel 1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†15.85	12.85	13.85	14.85										
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	18.50	19.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati includes Newport, Ky. St. Louis basing point includes Granite City, East St. Louis and Madison, Ill. San Francisco includes South San Francisco, Niles and Oakland, Calif. Chicago includes Gary, Ind. Claymont, Del., includes Chester, Pa.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah, Arkansas, Nebraska, Kansas. Delivered price may exceed by not more than $7 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $7 the nearest basing point price. Colorado is remote for Colorado consumers only.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 12.25c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 14.25c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, corroding or chemical, 6.40c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York State, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less than 2000 lbs.

Secondary Aluminum: All grades 14.00c per lb. except as follows: Low-grade piston alloy (No. 122 type) 13.50c; No. 12 foundry alloy (No. 2 grade) 13.50c; chemical warfare service ingot (92½% plus) 13.50c; steel deoxidizers in notchbars, granulated or shot, Grade 1 (95-97½%) 13.50c, Grade 2 (92-95%) 13.50c, Grade 3 (90-92%) 13.00c, Grade 4 (85-90%) 12.50c; any other ingot containing over 1% iron, except PM 754 and hardeners, 13.50c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb.; add 1c for special shapes and sizes, including 3-lb. ingot and 12-lb. round ingot; incendiary bomb alloy 23.40c, 50-50 magnesium-aluminum 23.75c, ASTM B80-41T No. 11 25.00c, ASTM B94-40T No. 13 25.00c, all others 23.00c. Prices for 100 lbs. or more; for 25-100 lbs. add 10c; for less than 25 lbs. 20c; incendiary bomb alloy f.o.b. plant any quantity; carload freight rate allowed all others for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.75-99.79% incl. 51.62½c; Grade C, Cornish refined 51.62½c; Grade D, 99.0-99.74% incl. 51.12½c; Grade E, below 99%, 51.00c.

Antimony: American, bulk, carlots, f.o.b. Laredo, Tex., 99.0-99.8% grade 14.50c, 99.8% and over (arsenic 0.05% max.; no other impurity to exceed 0.1% 15.00c. Add ¼c for less-carlots to 10,000 lbs.; ½c for 9999-224 lbs.; 2c for 223 lbs. and less.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz. $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $15 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $2.11 lb.; 100 lbs. or more on contract, $1.50 lb.

Indium: 99.5%, $10 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $36 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A, B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 28.75c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c, Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Bare, soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.50c Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2% 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu; 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c, f.o.b. Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil., 5%	9.250	9.000	4.625
Phos. br., A. B. 5%	11.00	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbitt-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 8.00c; Muntz metal condenser tubes 7.50c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more, plant scrap only. Segregated solids: S-type alloys (2S, 3S, 17S, 18S, 24S, 32S, 52S) 9.00c, 10.00c, 10.50c; All other high grade alloys 8.50c, 9.50c, 10.00c; low grade alloys 8.00c, 9.00c, 9.50c. Segregated borings and turnings: Wrought alloys (17S, 18S, 32S, 52S) 7.50c, 8.50c, 9.00c; all other high grade alloys 7.00c, 8.00c, 8.50c; low grade alloys 6.50c, 7.50c, 8.00c. Mixed plant scrap, all solids, 7.50c, 8.50c, 9.00c; borings and turnings 5.50c, 6.50c, 7.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.ob. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c; add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over 1½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Plates . . .

Plate Prices, Page 131

Approximately 750,000 tons of plates, shapes and bars will be allocated through Washington shortly for 152 Liberty ships just placed with the New England Shipbuilding Corp., South Portland, Me., a subsidiary of Todd Shipyards Corp., New York.

Based on first-half production, at least 13,340,000 tons of plates may be rolled this year and probably more, provided new facilities are completed and in operation by fourth quarter. In the first six months 6,670,660 tons were rolled; production for sale in 1942 was 11,543,000 tons. There are no concrete indications that shipbuilding will require less plate tonnage during the next five and one-half months; claimant agency commitments bear this out and rumors steel might be diverted from ships to meet part of the additional 2,000,000 tons wanted before the end of the year in the share-the-steel program appear unfounded. The reverse is likely.

Yard inventories in more cases are up somewhat, yet shipbuilders assert they are not getting more tonnage than needed to maintain or increase construction schedules. Because of allocation before the advent of CMP shipyards were not able to inventory as much as fabricators of other products operating under PRP. In the East, as elsewhere, attention is frequently called to apparent large stocks of plates piled at shipyards, but the mechanics of shipbuilding require balance and volume within reasonable limits to maintain assembly schedules. There may be an easing in plates in other directions before the year is out, possibly for new high-octane gas and synthetic rubber programs, but demand for shipyards should be maintained in total tonnage, but with some easing of pressure, although this is problematical.

Sheets, Strip . . .

Sheet & Strip Prices, Page 130

Sheet buying continues brisk, although well diversified. Some leading sellers now have little hot or cold-rolled tonnage left for shipment before December and recently delivery schedules on galvanized sheets have become noticeably extended. Some sellers can still make deliveries in October, but most appear to have little before November. This acceleration in galvanized sheet buying is attributed in part to more liberal quotas for the jobbing trade. The regulation permitting the increase in jobber tonnage became effective July 1 for third and fourth quarters. Mills are not to disrupt any schedules already definitely set up, however, and consequently distributors are finding it difficult to add to their quotas much before the early part of next quarter.

Demand for electrical sheets is being stimulated somewhat by radar requirements, although volume is still below normal as there has been a decline in needs for power transformers and certain other types of electrical equipment. Stainless steel demand is less active, as it appears that airplane builders have accumulated stocks which may need leveling off before it is necessary for them to enter the market again.

Except for warehouse requirements, which are steady, with galvanized tight, sheet demand in New England follows the ebb and flow of war contracts. Of these, shipyards account for a substantial tonnage, a good part of which is fabricated into subassemblies by shops with subcontracts. There are a few outstanding commitments for fair tonnage releases each month, with current orders for hot and cold-rolled geared to October-November delivery; drum stock capacity with a leading producer is taken up for the remainder of the year.

In the northeast area the effect of war on sheet demand, consumption and distribution is probably greater than on most steel products, without materially adding to total tonnage except in the case of ships; the increased load in that direction is partially offset by restricted construction, repairs and miscellaneous normal outlets. Tied in with revisions in the war program, fabrication changes and other factors involving substitution of methods and materials, some stamping shops are getting more volume, at least more than was the case earlier in the conflict, although the pickup has been greater on aluminum than steel in various instances.

Some producers of narrow strip have no capacity left for delivery this year for hot-rolled strip and only a little for cold-rolled narrow strip. Even this would not be available except for easing of schedules on machine gun clips. This easing has not been due to cancellations

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or cutbacks but to an extension of delivery schedules. Contributing to the tightening in sheet schedules is an increase in demand for drum stock for the Army.

Tin Plate . . .

Tin Plate Prices, Page 131

Because of the newly permissible lag between production of cold-reduced strip for tinning and production of tin plate, stocks of cold strip in coils are increasing. Hot mills are sandwiching in as much hot-rolled strip as possible whenever rolling schedules permit, on the theory that there will be little available in the heavy plate schedules late in this quarter and probably during fourth quarter. Because of this condition it will be impossible to wait for orders to filter through from tin mills and expect them to fit into the strip mill rolling schedules. The backlog of cold strip will act as a cushion and permit the most efficient rolling schedules possible on the hot mills. Cold mill capacity, of course, is considerably greater than the need at present and this is not expected to be an influencing factor on tin mill operations. Crop prospects are better than had been anticipated earlier and there is a probability that export plate demand will also increase. Electrolytic lines continue to roll slowly, with available business below capacity. The same is true of bonderizing lines and no immediate change is anticipated.

Bars . . .

Bar Prices, Page 130

Bar schedules continue to expand, with most producers of high-carbon bars having little to offer before November. Machine tool specifications are off but there is continued heavy demand from airplane engine builders and the maritime industry. Large rounds can no longer be supplied by some mills before December and at least one or two mills have nothing to offer before the end of the year. Cold drawers report sustained demand and have little to offer before November. Hot and cold alloy bars can be had during that month but where special treatment is necessary, and most of the alloy bars do require special treatment, most shipments now fall into next year. Owing to new electric furnace facilities which are now being brought in, deliveries on alloy bars are not as rigid as they were a month or so ago.

Versatility in demand features bar requirements in New England. With a strong trend toward alloys in some directions, larger forging shops are increasing allotment coverage each month, while small tool producers and those fabricating marine hardware are covered through the remainder of the year in some instances. Strong demand for carbon flats for hand tools is also maintained, notably by file manufacturers. Rhode Island shops in most instances require more bars, notably alloy, but in this machine tool builders are an exception. A place on heat-treating schedules of independent shops for the processing of bars usually bought through jobbers is difficult. Many of these shops are filled with other and heavier fabricated tonnage.

That machine tool builders have much tonnage to contribute to the share-the-steel program is doubtful. Purchases for some months have been conservative. In addition to forging, heavy demand and consumption emanates from small arms fabricators, shipyards and aircraft; the latter is mounting and widespread subcontracting continues in that field, notably by engine builders. A New Haven prime contractor, cut back on a submachine gun contract, is swamped with offers for aircraft work to fill the gap, which will revolve largely on bar consumption.

Demand for tool steel bars, rolled and forged, is in excess of capacity, reflecting the heavy load thrown on producers of cutting tools. This holds from continuity of operation many thousand new machine tools placed in production in the last two years. Nevertheless tool-steel makers and distributors are generally admitted to have done a good job in meeting heavy shop demand; extended deliveries on many cutting tools are due to large backlogs more than to steel shortages, although supplies of some specifications are tight.

Wire . . .

Wire Prices, Page 131

Wire mills are heavily booked on high-carbon specialties with nothing available on some products before fourth quarter delivery. The volume of high-carbon required for springs is notably strong, including music wire. Demand for the

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heavier tonnage projects for war requirements is maintained and large additional contracts for rope have been placed. Rope mill equipment is well filled through the remainder of the year and suppliers of wire are pressed to meet demand, although the sustained demand has been such this program has been well anticipated. There is a slight slackening in buying of some aircraft wire, including balloon cable. Inventories on some of this material are relatively high.

Rod tonnage is widely distributed and is better geared to overall finished directive quotas, although at the expense of some rod producers who could use tonnage now beng supplied other finishing mills. Directives on fencing and barbed wire for domestic consumption have been raised slightly with some producers. There is a slight recession in demand for heavier bolt size rods.

Rails, Cars . . .

Track Material Prices, Page 151

Strong indications have appeared that railroad equipment needs will be given greater consideration for fourth quarter. Excessive wear on rails and rolling stock is becoming increasingly apparent, with the result that some War Production Board officials are said to be convinced that relief must be forthcoming soon. Railroads stand in greatest need of motive power. Locomotive builders have heavy orders on books but most is for American military forces abroad and for lend-lease. On a relatively less degree cars are going abroad for military and lend-lease account. All of this has been at the expense of domestic carriers. Equipment building capacity is available for domestic requirements, particularly building capacity, but the bottleneck has been allocation of steel and other materials.

The first domestic freight car award noted in some time involves 500 fifty-ton composite hopper cars for the Chicago & Alton, placed with American Car & Foundry Co. Locomotive buying is featured by placing of ten steam freight locomotives by the Norfolk & Western with its own shops. The award has approval of the War Production Board. Six switch engines are reported to have been placed by the Wheeling & Lake Erie with the American Locomotive Co., subject to approval of WPB.

Association of American Railroads reports that as of June 1 class I railroads had 33,537 new freight cars on order, compared with 49,548 at the same date last year. These included 3494 plain box cars, 2525 automobile box, 7183 gondolas, 18,457 hoppers, 200 stock and 1678 flat cars. These roads also had 937 new locomotives on order June 1, including 418 steam, seven electric and 512 diesel. A year ago the number on order was 950.

Class I railroads put 7484 new freight cars in service in the first five months of 1943, compared with 44,546 in the same period last year. The new cars this year included 2385 hoppers, 3504 gondolas, 1033 flats, 135 automobile box, 379 plain box, one stock and 47 miscellaneous cars. They also put into service 251 new locomotives in the five-month period, 178 steam, 11 electric and 62 diesel. Last year in the same period they installed 292 locomotives.

Structural Shapes . . .

Structural Shape Prices, Page 151

But for shipbuilding and a few outstanding tonnages involved in the late stages of the industrial war plant program, the structural steel industry would be in a bad way. Operating at 65-70 per cent of rated capacity, structural mill schedules are out of balance, due to preponderance of ship sizes and the lack of the more standard heavier sections. The fabricating end still gravitates into new types of work, welding capacity heavily engaged on more heavy sheets and plates with fewer shapes. Production directives as yet do not permit rolling in volume sufficient to match aggregate demand, which in part accounts for the continued tightness in shapes. While overall demand is admittedly down because of construction limitations, so is available supply based on semifinished available.

At first glance postwar outlook for structural steel appears dubious, but some large public works are on the boards for quick action at the cessation of the war. In the industrial field expansions are probable in plants producing essential consumer goods, a large postwar demand backing up for many. Additions to this type of plant have been few.

Plans are under way for immediate postwar action on a New York city program requiring close to 600,000 tons of fabricated structural steel; subway extensions will need 285,000 tons, while

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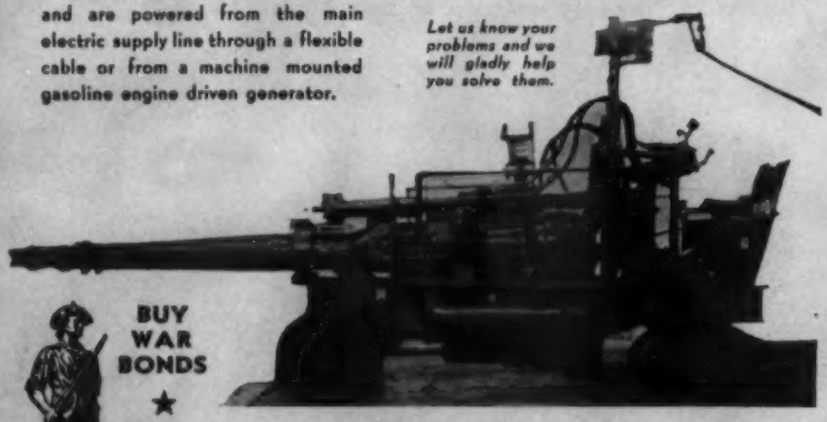

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other large tonnages include: Board of education schools, 76,000 tons; docks and piers, 76,500 tons; hospitals, 42,000 tons; department of marine and aviation, 18,000 tons. New York state also has a postwar public works building taking almost as much structural steel.

An interesting new angle is the large tonnage for barges which have been placed with various inland shipyards and which will be used to carry oil for domestic use from the Southwest to the East Coast by way of eastern canal routes. Actual tonnages have not been divulged on this program but it is understood that total steel involved will run close to 300,000 tons, of which about 10 per cent will be structural material. There is fair demand for miscellaneous shapes from jobbing sources for maintenance and repair programs, and a continuing demand for light angles and channels to finish up war plants still under construction. The steelworks expansion program is now taking fairly good tonnage of structural material and some aircraft plants are still taking deliveries.

Fabricators in the Chicago area, most of whom have been producing ship components, now find themselves nearing completion of contracts and are beginning to wonder whether additional business of the same kind will be given them. General construction work is almost lacking, now that a few fabricators are finishing up war plants. No inquiries for structurals are before the trade, but it is known that a few plants are sharing in some relatively large tonnages which the government is promoting without public announcement.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 151

Except for small lots ranging well below 100 tons, the Chicago area is almost totally devoid of reinforcing steel demand. Above this range, only three jobs are current. These have been bid; one of 130 tons for a Burlington railroad station in Burlington, Iowa; a second of 240 tons for an addition to Hines Veterans' hospital, Chicago, but in the latter alternate construction eliminating steel may be adopted; and the third of about 200 tons for an airplane propeller plant in Milwaukee. Little new construction is in sight at the moment. Competition among suppliers is keen, even though jobs are small.

Scrap . . .

Scrap Prices, Page 154

Scrap from the eastern seaboard is moving through the barge canal to Buffalo and thence to Canada. No concern is expressed over this movement as Buffalo melters in general are well supplied and some Dominion material is received from time to time as a partial balance. Buffalo dealers hear that negotiations are under way for a large sale of surplus Canadian scrap to users in the United States.

Heavy melting steel is in better demand in eastern Pennsylvania as consumers become better aware of the steadily declining volume of yard scrap and the danger of cutting further into their reserves. With low phos scrap in slow demand some dealers are selling to open-hearth operators rather than hold it for premiums from electric furnace users.

Melters in the Cincinnati area are taking scrap more freely after a period when they held purchases at a minimum, especially of remote scrap carrying high freight charges. One mill, which has taken little scrap for several months, is seeking No. 1 and No. 2 heavy melting steel and may relax on other grades. Country scrap still lags and dealers continue to call attention to possibility of a pinch later in the year.

Inventories of open-hearth and electric furnace steel scrap are gradually being bolstered in New England. In adding to reserves, however, melters hold to specifications and better quality, which has steadily improved in recent weeks. There is no great pressure for steelmaking scrap, but the more desirable tonnages are readily taken when available. Shipyard scrap holds an increasingly important place, but reserves with electric furnaces and other consumers of low phos materials are substantial and buying is less brisk in these directions. As with better segregated and prepared plant scrap, substantial volume of shipbuilding scrap is allocated, some to eastern Pennsylvania. Demand for much light plant scrap is not up to production without crushing or other preparation. Blast furnaces continue to take borings and turnings, but steel works are cautious in buying mixed alloy material for certain high quality steels.

An unfavorable long-range factor is the small volume of unprepared material reaching dealer yards, which is coupled with reduced supplies from automobile dismantling. Demand for foundry grades

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continues slack, a few specialties for malleable melts excepted. Railroads are offering small lists; some equipment which would normally be scrapped is maintained and the floating supply from railroads is reduced, most of which is allocated. Tonnage of so-called remote scrap is not considered large.

In the New York district buying of open-hearth grades is spasmodic, with allocations directing some tonnage to eastern Pennsylvania. Railroad scrap is also allocated but tonnage offered is dwindling, as a minimum of equipment is being discarded and floating supplies are well cleared. Light grades of plant scrap, notably alloys, are not moving well and are accumulating at some shops. Low phosphorus grades from shipyards are produced in considerable volume but consumers, including electric furnaces, are well stocked. Demand from steelworks is good for charging box and heavy breakable grades but gray iron shops are buying sparingly and some are out of the market. Material reaching dealers' yards continues restricted.

St. Louis melters continue to dip into reserves as current receipts are not sufficient for the present high rate of steelmaking. Tonnage held back by spring floods seems to have been cleared up and country scrap is not being collected, farm work preventing. Some tonnage is coming from Oklahoma and Texas but not in large lots. Labor situation in yards is growing worse.

Scrap receipts in the Chicago district are essentially unchanged in volume, though perhaps a little lighter, and are generally regarded as unsatisfactory for this season of the year. Consumption closely balances shipments, thus protecting inventories, but this is the period in which stocks should be built up. Unless the picture changes shortly steelmakers fear a shortage next winter. Industrial scrap continues a fairly even flow and the large amounts of turnings and borings are acceptable. Railroad material is light, and dealer offerings are narrowing. In spite of their manpower problems, dealers are able to move rather promptly all the scrap which passes through their yards. Cast scrap is disappearing, and demand is holding, making for an uncomfortable situation in these grades.

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● Two Aluminum Bronze half Spindle Slippers for a 46 inch Blooming Mill. Weight of rough castings 343 lbs. each. Hammond Alloy No. A-26.

● Screw-down nut for 34 inch Blooming mill. Specification: Hammond M-20 Manganese Bronze. Net weight, 4200 lbs.

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Iron Ore . . .

Iron Ore Prices, Page 153

Receipts of iron ore and scrap from the upper lakes are expedited by recommendation of the Lake Carriers' Association that ships operating in the Buffalo harbor be allowed draft of 21 feet, an increase of one foot. This permits cargoes 500 to 1000 tons larger than the former draft. This change followed the near-record level of the lakes this year. Ships now can go directly to Buffalo instead of lightening loads by unloading part of their cargoes at other harbors to reduce draft. Lake Erie is 1.5-foot higher than in June, 1942, and within three inches of the highest mark since 1900.

Tank Barges Awarded

Recent shipbuilding awards include 162 tank barges, divided among nine shipyards. The barges are to be of steel with 9500 barrels capacity each. The order went to the following builders: St. Louis Structural Steel Co., St. Louis, 30 barges; Consolidated Steel Co., Orange, Tex., 20; Schmidt Barge Yards, Houston, Tex., 20; Chicago Bridge & Iron Co., Chicago, 15; Sabine Construction Co., Port Arthur, Tex., 15; Samuel-

Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten Types

(For each 1% tungsten contained)

Solid scrap containing over 12%	1.80c
Solid scrap containing 5 to 12%	1.60
Turnings, millings containing over 12%	1.60
Do., 5 to 12%	1.40
Turnings, millings, solids under 5%	1.25

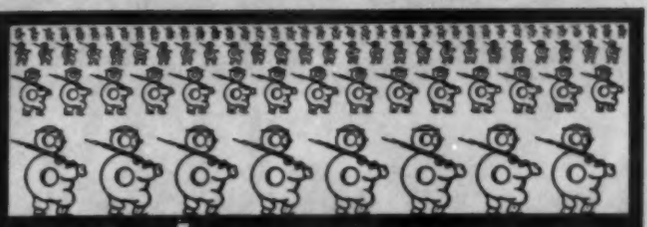
Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium	12.50
Turnings, millings, same basis	10.50
Solid scrap, not less than 3% molybdenum, 4% tungsten, 1% vanadium	13.50
Turnings, millings, same basis	11.50

Mixed Scrap

(Molybdenum and Tungsten Types)

Solid scrap, each 1% contained tungsten	1.60
Solid scrap, each 1% molybdenum	.80
Millings, turnings each 1% tungsten	1.40
Millings, turnings, each 1% molybdenum	.70



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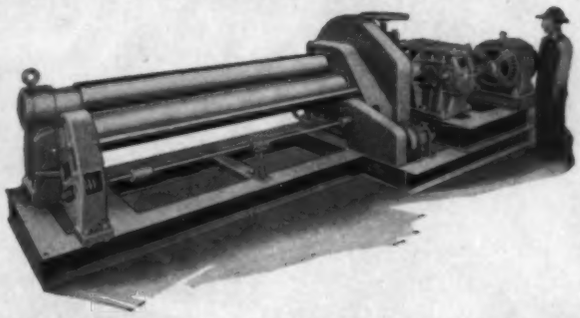

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MOTORIZED PLANETARY REDUCER

Horizontal drive, made in 35 sizes in ratios of 10 to 1200:1 and from ¾ to 75 horsepower.

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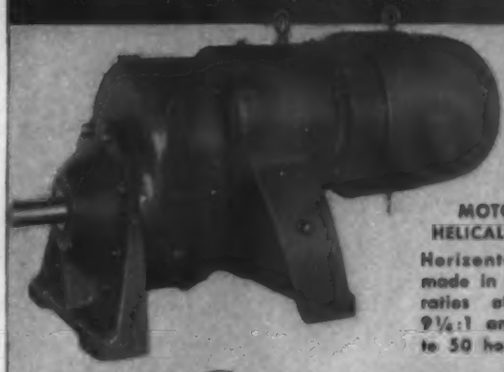

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Horizontal drive—made in 13 sizes in ratios of 1¼ to 9¼:1 and from ⅝ to 50 horsepower.

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Horizontal drive—made in 11 sizes in ratios of 6 to 80:1 and from ⅛ to 50 horsepower.

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War time requirements make the D.O.James Motorized Reducers a very important *Must* in solving and meeting the power-saving needs of modern industry. Their accessibility and compactness make them most desirable when floor space is limited. Their soundness of design and manufacture insures maximum efficiency with minimum maintenance.

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MAKERS OF ALL TYPES OF GEARS AND GEAR REDUCERS

son Co., Beaumont, Tex., 17; Kane Boiler Works, Galveston, Tex., 17; Bolan Machine Works, New Orleans, 16; United States Engineer Yards, New Orleans, 12.

Pusey & Jones Corp., Wilmington, Del., has been awarded a contract for two additional C-1 cargo ships for the Maritime Commission, diesel equipped, 413 feet long, 5028 gross tons.

Pig Iron . . .

Pig Iron Prices, Page 152

Restrictions on production of borderline equipment for war use, notably for the textile, paper and heating industries, tends to limit pig iron melt in New England. August deliveries of foundry grades will be down slightly, partly due to somewhat larger carry-overs by more shops and a continued downward trend among gray iron foundries as a whole. This loss could easily be made up were releases granted the above named group of equipment builders, several of which normally are among the heaviest consumers in the district.

There are indications that some easing of restrictions is likely; low pressure cast iron boilers are scheduled for production at current rates at least, while emergency replacements in textile mills will become increasingly necessary as worn and battered equipment gives out. The same applies to shops building paper mill equipment. Basic and malleable requirements are as high as ever; indications are consumer schedules in most instances will be maintained for the duration.

Steel foundries, notably those producing high pressure steel valves, require substantial quotas of iron; ship construction, synthetic rubber and high-octane gasoline plant expansions have thrown a heavy load on valve makers, which is reflected in steady and, in some cases, mounting pig iron tonnage. The Everett, Mass., cast pipe foundry is resuming melt after being down for a brief period. On pipe, most foundries have been slow, but the gap in some cases has been made up by demand for castings for ships and miscellaneous war contracts.

OPA ALLOWS MYSTIC $1

Mystic Iron Works, Everett, Mass., has been granted an additional premium of $1 per gross ton on pig iron, effective from May 20, Office of Price Administration announces. A premium of $1 per ton was allowed several months ago to compensate for disadvantages in freight charges. Recently the company petitioned for further relief, submitting cost figures in support of its claim, the additional premium being the result.

Warehouse . . .

Warehouse Prices, Page 153

New zone prices on warehouse products have been favorably received generally by warehousemen. New schedules are said to have simplified pricing procedure. Mill deliveries have been maintained well, though in some instances cold-rolled bars and alloys are difficult to obtain before the first of the year.

Distributors' inventories are considerably larger than during recent months as special provisions have been made to insure sufficient tonnage in stores to meet essential needs.

Increasingly heavy demand is being met, due to lengthening mill deliveries to consumers. Some inquiries are for relatively large tonnage, too large to be handled from warehouse. Supply is well rounded compared with prior months, except for large rounds and cold-drawn flats.

Nonferrous Metals . . .

Nonferrous Prices, Page 155

New York—Scrap inventories and the location of used metal for remelting are influencing copper allocations increasingly with battlefield scrap a mounting factor.

August deliveries will approximate those of last month; overall requirements do not change greatly from month to month, but rather distribution to individual consumers whose scrap holdings are taken into consideration. Distribution of returned scrap is more or less a geographical circumstance, depending on the port of entry which in turn is reflected in new copper allocations. A sorting problem is involved, some of the larger calibre cases going to reloaders

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LOW TEMPERATURE WELDING
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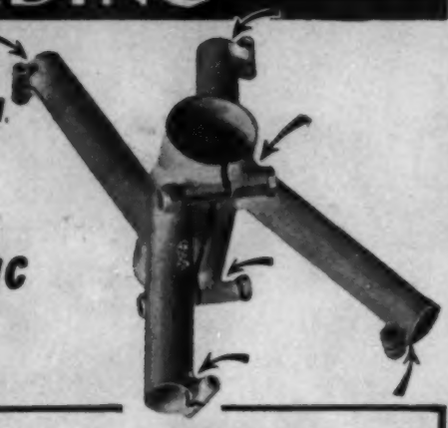
FASTER PRODUCTION
MADE POSSIBLE WITH
CASTOLIN EUTECTIC
ALLOY No. 16



PROBLEM

Fabrication of this intricate steel aircraft tubular assembly with high temperature fusion welding was impractical because the high heat resulted in distortion and softening of the metal. Additional time required for machining the joints rendered the process too costly.

SOLUTION

Castolin Eutectic Alloy No. 16 eliminated the distortion and softening of the metal. How? This Low Temperature alloy binds at 1300° F. • Gives tensile strength of 117,000 lbs. per sq. in. • Three times faster than fusion welding • One third the cost of silver solder — three times the strength • Clean thin fillets eliminate after-machining.

Castolin Eutectic Alloy No. 16 for use on all steels: chrome-moly, chrome nickel, high speed vanadium steel, iron and malleable iron. Also for joining these to other metals.

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(LUFTWAFFLE)
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He boasted that United Nations planes would never bomb Berlin. How's the air down in those Berlin shelters these days and nights . . . eh, Hermann?

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LUBRICANTS FOR THE STEEL INDUSTRY SINCE 1885

while other tonnage goes for remelting, in which a cleaning process also is involved.

August allocations for the second month of CMP resulted in no delay in filling certificates on the part of producers. With CMP operating on a quarterly basis, the copper division is better able to estimate and foresee monthly requirements. Further refinement in the operation of CMP, which has got away to a good start as far as copper is concerned, is expected for September. The MRC stockpile is maintained and in balance, withdrawals to meet temporary stresses being replaced without serious delay. Most orders covering the use of copper continue to be toward further restrictions, one covering electric fuses in which copper is banned in non-current carrying elements.

Utilities are getting little copper even for repairs. The labor situation at the mines is becoming acute and seriously threatens the program for heavier output by domestic producers. The Scrugham stockpile bill hearings indicate the United States is producing about 40 per cent of the total copper available to the United Nations; Latin American production supplements the domestic supply, providing domestic munitions plants with approximately 60 per cent of the Allies' available supplies. The bill favors stockpiling after the war.

Among scrap developments is an order providing that charges for processing, treating, handling and other services performed in toll conversions may be no larger than the difference between the maximum price for the copper-bearing scrap metal and the ceiling price for refined copper. Thus, in the conversion of 9.75-cent scrap copper, the highest charge will be 2.25 cents a pound based on 12.00c Connecticut valley base for electrolytic.

With prime western zinc stocks declining and with those of high grade increasing, allocations of the latter are expected to be larger for August. Also as with copper some time back, high grade will be stocked heavier at four ordnance plants and there are indications toward the encouragement of slightly higher inventories to act as partial insurance against more congested transportation later. This has already developed in lead. Some zinc has been stockpiled and consumers are getting sufficient supply for essential needs. The labor situation is worse in zinc mines, hampering maintenance of production of ore. Sales of small amounts of zinc dust without an allocation order by dealers as well as producers has been authorized by WPB.

More activity in lead for August delivery is gradually absorbing domestic production for next month and consumers are taking some tonnage from MRC stocks in line with easing of inventory regulations during the months of easier transportation. Lead taken now will be for Fall consumption which will affect the trend in the months ahead.

Buffalo—Aluminum borings have become a drug on the market here as dealers refuse to accept additional offerings. Dealers have been accumulating the majority of recent purchases in their yards and warehouses in order to keep interest in the market. Now, even with prices reduced, dealers are turning down offerings. As a result, numerous war plants in the area are wondering what to do with their turnings.

One of the principal consumers of yellow brass borings has placed an embargo on this item also. Sentiment in the nonferrous markets leans to the bearish side, except for a strong undertone which still dominates the copper market.

Canada . . .

Toronto, Ont.—While there has been some increase in steel production, with a larger percentage of new materials going directly into war equipment, mill operations are down to approximately 95 per cent of capacity, chiefly because open hearths and other furnaces are undergoing repairs. Owing to increased capacity that went into operation at the first of this month, it is stated that July's production figures will show fair improvement over any of the earlier months this year. Steel mills still are facing labor problems, especially with respect to skilled workers, but at the moment no strike troubles appear imminent. While steel production has not been affected by coal shortage, the coal situation generally is far from favorable, and it has been rumored that many of the larger buildings that were forced to change from oil to coal burners last year may be advised to change back to their original fuel for the coming winter.

Local mill representatives state that new placements since the first of the month have been considerably below the average for the year. However, they also state that there has been no reduction in commitments and books are filled for the current quarter, with backlogs

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Morrison Model "R" Air-Circulating Type Furnace for fast, economical heat treating. Temperature range to 1750°F.
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Typical Examples of Morrison Engineered oil, gas and electric fired furnaces and ovens now giving complete satisfaction in every type of industrial service. Many standard types can be built in four to six weeks—in time to help you lick your war production difficulties.
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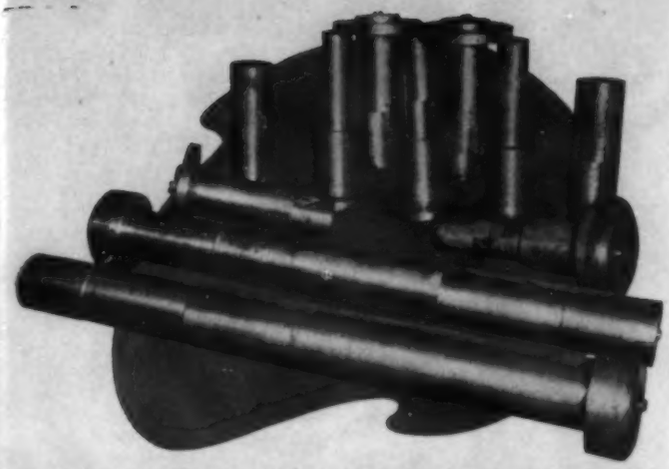

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FULLERGRIPT BRUSHES have greater holding and non-shedding qualities, resulting in longer life and more dependable operation. Less frequent replacements will save you time and money. Send blueprints or specifications of your requirements.

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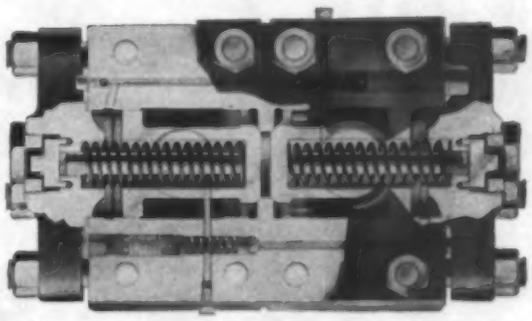
Relieves excessive pressure from the high side to the low side, independent of which side of the system happens to have excessive pressure.



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The coveted Navy "E" Pennant—awarded to Bayard for excellence in fulfilling Naval contracts

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that will absorb most production to the end of the year. Mills are under the direction of the steel controller, both with regard to the acceptance of new orders and delivery of finished and semi-finished steel. According to plans for increase in war materials production, announced by the minister of munitions and supply, it appears there will be a substantial jump in steel demand on this account in fourth quarter.

As far as plate is concerned, mills are booked almost solid to the end of the year and are assured of sustained high demand for the duration. While there seems to be some slackening in deliveries to shipbuilders, with larger tonnages being made available for the more important non-war consumers, including rolling stock builders, agricultural implement industry, etc., there has been no actual curtailment in shipbuilding activities. Heavy imports are arriving from the United States to take care of shipbuilding needs. Boilermakers are said to be receiving more plate, especially those producing components for ships.

Sheet buying fell into a slump during the week, but this is no indication that consumers' demands are dropping. On the contrary, mills are almost fully booked on sheet production to the year end. Substantial tonnages also have been placed in the United States, and it now is stated that American mills are booked through October and there is little additional tonnage available on Canadian account for the remainder of the year.

Bar cancellations, which were fairly extensive a few weeks ago, following the announcement of a revised war production program, have ceased and have been replaced by a fairly steady flow of new orders, some with revised specifications. Small lot buying is brisk, but most of the large tonnage orders already have been placed both for carbon and alloy bars. Shipbuilding, aircraft and gun plants are the principal buyers. Shipments have speeded up in some quarters under the direction of the steel controller.

Little change is reported in the scrap iron and steel markets, except for increased imports from the United States. According to Canadian dock officials, about 5000 tons of steel scrap entered Canada during the week from New York state, and others are said to be on the way. Canadian brokers, however, state that they are still having difficulty in obtaining scrap in the United States and in most cases the price is above the Canadian ceiling.

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All Atlas Coke Oven Equipment is of heavy-duty construction permitting the peak operating conditions required in today's stepped-up production schedules. As a result of years of experience, Atlas is able to design and build equipment, to meet the requirements of each particular coke plant. Detailed information available on request.

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Steel in Europe . . .

London—(*By Radio*)—Heavy pressure is being exerted in Great Britain for material for shipbuilding and aircraft, with bookings in some instances running to the end of the year. Great expansion has taken place in production and consumption of alloy steels. Deliveries of semifinished steel have shown considerable improvement in the past few weeks, adding to finished steel supply of high-grade material used in war products.

DPC Authorizes Plant Expansion, Equipment

Defense Plant Corp. has authorized the following expansions and equipment purchases (figures are approximate):

Babcock & Wilcox Tube Co., Beaver Falls, Pa., for facilities at a plant in Pennsylvania at cost of $100,000.

Delaware Machinery & Tool Co. Inc., Muncie, Ind., for equipment for a plant in Indiana at cost of $350,000.

Standard Oil Co. of California for plant facilities in California at cost of $13,500,000.

Tube Turns Inc., Louisville, Ky., for equipment for a plant in Kentucky at cost of $170,000.

General Electric Co., Schenectady, N. Y., for additional facilities in Massachusetts, to cost $380,000, making overall commitment $6,000,000.

Wilkening Mfg. Co., Philadelphia, for additional equipment at a plant in Pennsylvania, costing $85,000, making overall commitment $400,000.

Fairchild Engine & Airplane Corp., Hagerstown, Md., for additional facilities for a plant in North Carolina, to cost $400,000, making overall commitment $3,800,000.

Phelps Dodge Corp. and Phelps Dodge Refining Corp., New York, for additional facilities at a plant in Arizona, to cost $150,000, making overall commitment $28,700,000.

C. G. Conn Ltd., Elkhart, Ind., for additional facilities at a plant in Indiana, to cost $80,000, making overall commitment $775,000.

Goodyear Tire & Rubber Co., Akron, O., for additional facilities at a plant in Texas, to cost $1,250,000, making overall commitment $6 900,000.

Hydraulic Equipment Co., Cleveland, for additional equipment at a plant in Ohio, to cost $25,000, making overall commitment $110,000.

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OPEN STEEL FLOORING • SAFETY STEPS
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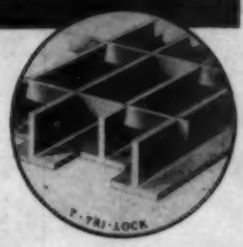

WE have some tapping operations at this plant which are correctly termed as "tough". To meet production requirements we had to make our own taps for the DIFFICULT tapping jobs.

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We offer our service to the industry on the basis of EXPERIENCE.

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Highest Quality . . . . . Long Service
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BEALL KANT-LINK SPRING WASHERS

KEEP BOLTED ASSEMBLIES *permanently* TIGHT

BEALL Spring Washers compensate for wear, bolt-stretch, corrosion and break-down of finish. They meet rigid Army, Navy and Air Corps specifications. Available in Carbon Steel, Stainless Steel, Phosphor Bronze, Everdur and Monel Metal. Finished in Cadmium Plate, Galvanized, Silver and Parkerized. IMMEDIATE SHIPMENT of all standard sizes.

WIRE US your requirements

BEALL TOOL CO. (Div. Hubbard & Co.)
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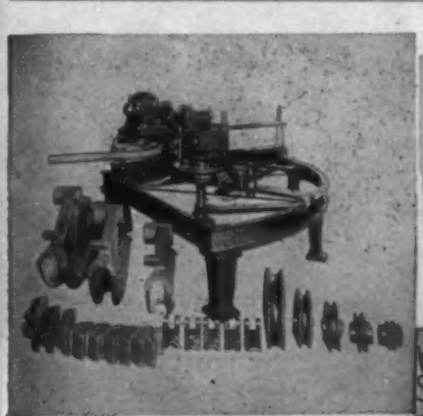

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SHAPE CONTRACTS PLACED

13,000 tons, industrial plant, in state of Washington, to Four V Structural Companies, Chicago.

REINFORCING BARS . . .

REINFORCING STEEL PLACED

3880 tons, aircraft small parts building, Willow Run plant of Ford Motor Co., Ypsilanti, Mich., to Bethlehem Steel Co., Bethlehem, Pa.

333 tons, Alcan highway, Edmonton, to Des Moines Steel Co., Des Moines, Iowa.

REINFORCING STEEL PENDING

200 tons, airplane propeller plant, A. O. Smith Corp., Milwaukee; bids July 15.

PIPE . . .

CAST PIPE PLACED

330 tons, 24, 16 and 12-inch, Eighth avenue South improvement, Seattle, to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

RAILS, CARS . . .

FREIGHT CARS PLACED

Chicago & Alton, 500 fifty-ton composite hoppers, to American Car & Foundry Co., New York.

LOCOMOTIVES PLACED

Norfolk & Western, ten 2-6-6-4 type steam engines, to its own shops at Roanoke, Va., under authorization by WPB; these are in addition to 15 of the same type ordered more than a year ago.

Wheeling & Lake Erie, six switch engines, reported placed with American Locomotive Co., New York, subject to approval of WPB.

then it's time to investigate the

AMERICAN RING TURNINGS CRUSHER

Chips, borings and turnings can be a terrific nuisance in any shop where automatic screw machines, lathes and planers, etc., pile up daily heaps of metal refuse. This waste byproduct is too valuable to throw away and too bulky to store. The problem is solved by the American Ring Turnings Crusher. This crusher utilizes the famous rolling ring principle of crushing, quickly and economically reducing bulky turnings of low or high carbon steel, alloy steel or brass into "Chips".

American Ring Turning Crushers are built in various sizes; we will study your requirements, and recommend the proper size crusher for your particular needs.

ORIGINATORS OF THE ROLLING RING CRUSHING PRINCIPLE

Rear View
Size No. 2400

AMERICAN PULVERIZER COMPANY
1539 MACKLIND AVE ST LOUIS MISSOURI

CONSTRUCTION AND ENTERPRISE

OHIO

AKRON, O.—Firestone Steel Products Co., 1292 Firestone Parkway, will build a one-story plant addition costing about $70,000.

CLEVELAND—American Coach & Body Corp., East Ninety-fifth street and Woodland avenue, manufacturer of steel and aluminum forgings, will increase facilities to expand production by an addition 67 x 145 feet, 28 feet high. James Holan, 9503 Woodland avenue, is president.

CLEVELAND—Browning Crane & Shovel Co., A. Cary, president, 16226 Waterloo road, has let contract to Gillmore-Carmichael-Olson Co., 1873 East Fifty-fifth street, for a two-story 50 x 200-foot warehouse, one story 50 x 100-foot machine shop, one story 35 x 62-foot processing building and 15 x 40-foot service building. Cost is estimated at $75,000. (Noted July 5.)

CLEVELAND—Grand Home Appliance Co., Cleveland Distributing Co. and Cleveland Foundry Co. have been organized by Charles Follett. Smith Warder and the statutory agent, L. C. Wykoff, Terminal Tower, Cleveland. The first company will manufacture various home appliances, the second deal in machinery, tools and equipment and the third will conduct a general foundry and machine shop.

CLEVELAND—Hydraulic Equipment Co., Hall Kirkham, president and treasurer, will purchase additional machinery and equipment to enlarge production, with $25,000 grant by Defense Plant Corp. Products are control devices for lift trucks and bulldozers for handling war materials at airfields, harbors and warehouses.

CLEVELAND—Victory Goggle Co., Sidney Schwartz, 10000 Euclid avenue, plans to enlarge facilities for manufacture of goggles for the Army.

MASSILLON, O.—Canton Drop Forging & Mfg. Co., C. A. Brauchler, president and general manager, 207 Twelfth street, Canton, O., is having plans made for alterations to old Fort Pitt Bridge Co. plant, at cost of about $1,000,000. E. McGeorge and W. R. Hargett, 9400 Quincy avenue, Cleveland, are architects.

MONTPELIER, OHIO.—Winzeler Stamping Co. has been sold by its founder, Dan W. Winzeler, to Robert Winzeler, who is continuing the business. The company is engaged entirely on war work, largely for the Navy.

MASSACHUSETTS

BEVERLY, MASS.—R. Southwick, 22 Hale street, has let contract to E. P. Phinney, 333 Maple street, Danvers, Mass., for a 500-unit capacity frozen food storage plant, to cost about $40,000.

SOUTH LANCASTER, MASS.—Atlantic Union College has let contract for two-story 55 x 145-foot central power station to L. Neri, 131 North Main street, Millbury, Mass. Cost is estimated at $100,000. A. J. Roy, 32 Elm street, Worcester, Mass., is architect.

RHODE ISLAND

WOONSOCKET, R. I.—Branch River Woolen Co., has let contract to Temple & Crane Inc., 80 Federal street, Boston, for coal unloading facilities, including railway trestle, storage and handling facilities. Lockwood-Greene Co., 10 Rockefeller Plaza, New York, are engineers.

NEW YORK

BUFFALO, N. Y.—Machinery, equipment and goodwill of Sowers Mfg. Co., 1288 Niagara street, will be sold at auction July 20, including completely equipped foundry, machine and pattern shop.

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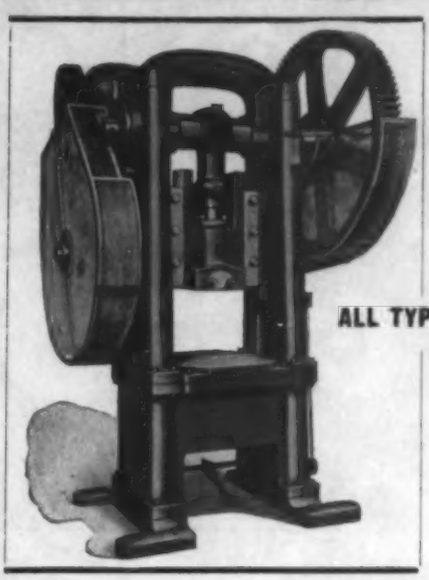

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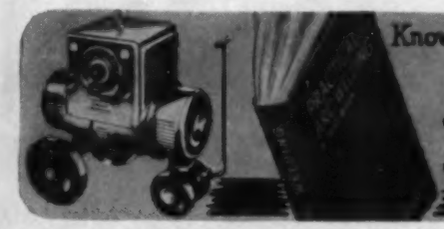

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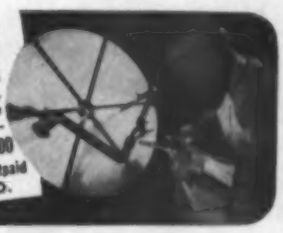

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NEW JERSEY

JERSEY CITY, N. J.—Western Electric Co. Inc. has leased a factory building at 336 Claremont avenue, Jersey City, five-story mill-type structure containing about 8000 square feet floor space. A month ago the company leased the 70,000-foot plant of the Holland Laundry Co., Bayonne, N. J.

MICHIGAN

DEARBORN, MICH.—Cag Products Inc., 12831 Ford road, has been incorporated with $25,000 capital to manufacture dies and mechanical devices. Charles Vogel, 5275 Oregon street, is agent.

DETROIT—Welch Industries, Machine Tool Division Inc., 19400 West Eight-mile road, has been incorporated with $250,000 capital to manufacture and sell steel, tools and machinery, by R. R. Welch, Franklin, Oakland county, Mich.

DETROIT—Industrial Electronics Inc., 21 Henry street, has been incorporated with $10,000 capital to do experimental and development work in electricity, by James W. Head, 19199 Ferguson avenue, Detroit.

DETROIT—Signal Relays Inc., 11643 Linwood avenue, has been incorporated with $40,000 preferred and $10,000 common stock to manufacture and sell signal relay devices by Vernon Goetz, 11643 Linwood avenue, Detroit.

DETROIT—Gray Marine Motors, 2970 East Jefferson avenue, has awarded contract to Reisdorf & Brewe, 805 Donovan building, for a warehouse building, and electrical contract to W. D. Gale, 7145 Tireman avenue. Cost estimated at $56,000 (Noted May 3.)

DETROIT—Ready-Power Co., 3826 Grand River avenue, has been incorporated with $250,000 capital to conduct an electrical, mechanical and chemical business, by Harold D. Gumpper, 31 Beverly road, Grosse Pointe, Mich.

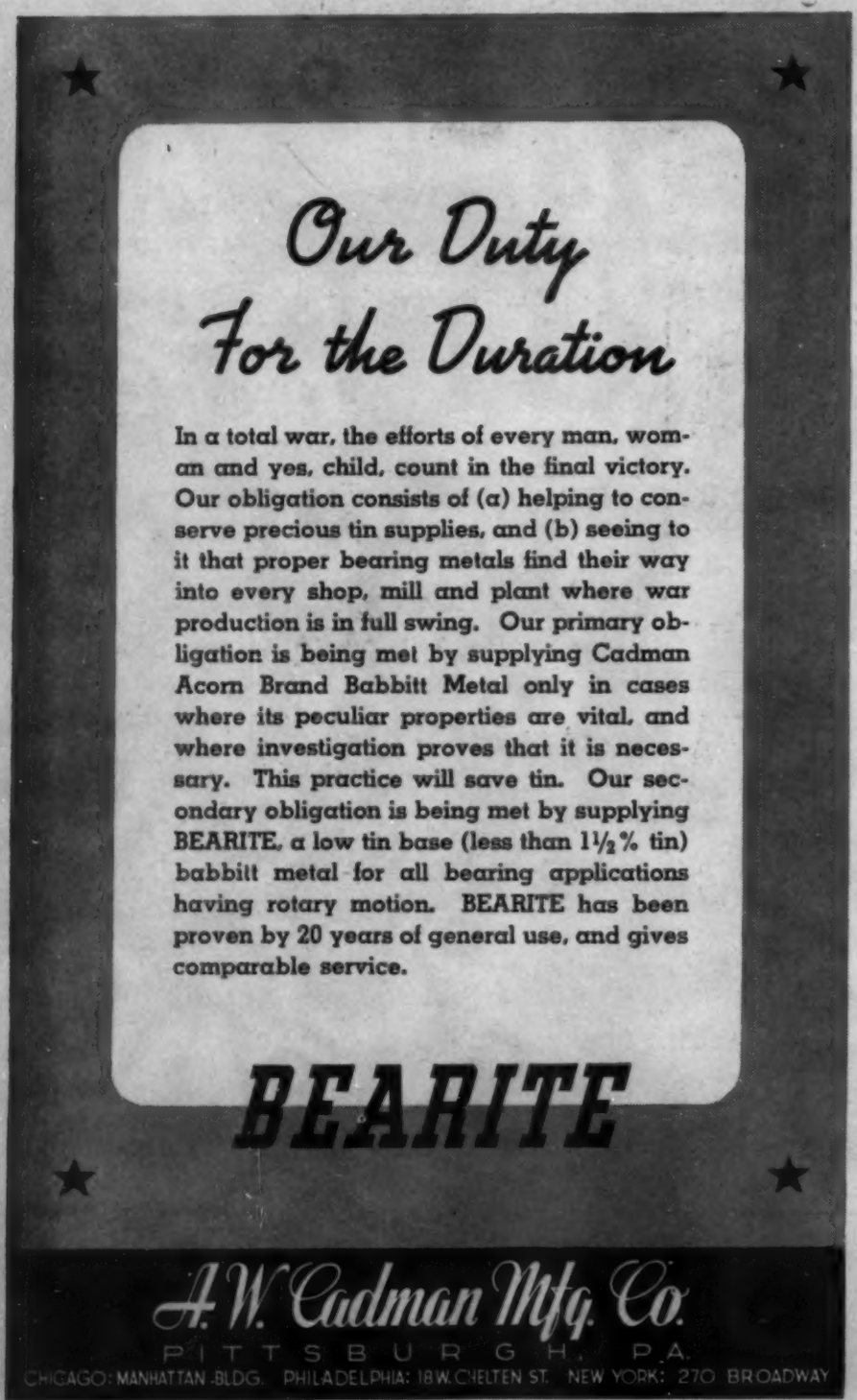
DETROIT—Motor Products Corp. has let general contract to Albert A. Albrecht Co., 1204 Penobscot building, for an addition to its plant at 11801 Mack avenue.

GRAND RAPIDS, MICH.—Melin Mills has awarded a contract for addition to its machine shop at 1331 Phillips avenue SW, to Strom Construction Co., 625 First street, Grand Rapids. Cost estimated at $8000.

YPSILANTI, MICH. — Michigan Aluminum Casting Co., 200 South River street, has been incorporated with $1100 capital to manufacture and sell castings and foundry products, by J. G. Krause, 695 East Grand boulevard, Detroit.

MUSKEGON, MICH. — Brunswick-Balke-Collender Co. has let contract to Strom & Strom, 1700 Sixth street, Muskegon, for an airplane assembly building at the county airport, to cost about $375,000.

SAGINAW, MICH.—Julius P. Mallack Inc., 2329 North Michigan avenue, has been incorporated with $25,000 capital to manufacture sheet metal work, by Marshall A. Valletto, 3006 Walnut street, Saginaw, Mich.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ILLINOIS

ROCKFORD, ILL.—Mid-States Industrial Corp. plans construction of a one-story factory addition 40 x 130 feet. Hubbard & Hyland, Gas & Electric building, are architects.

ROCKFORD, ILL.—Damascus Steel Products Corp., manufacturer of steel cutlery, tools, etc., has let contract to Linden & Sons Inc., for a one-story plant addition 35 x 105 feet.

ROCKFORD, ILL.—Mattison Machine Works, manufacturer of woodworking, grinding and polishing machinery, has let contract to Linden & Sons Inc. for a one-story plant addition.

MARYLAND

BALTIMORE—American Brake Shoe & Foundry Co., 2001 Laurens street, has let contract to Cummins Construction Corp., 803 Cathedral street, for overhead crane, foundations and concrete retaining wall. Cost estimated over $50,000.

WEST VIRGINIA

CLARKSBURG, W. VA.—Hope Natural Gas Co., Clarksburg, has asked Federal Power Commission for authority to build and operate a 22-inch natural gas pipeline from Kanawha county to the Hugoton gas field in southwestern Kansas, at cost of about $51,000.

MISSOURI

KANSAS CITY, MO.—Universal Machine Works, 1738 Locust street, has let contract to Flett Construction Co., 1102 East Forty-seventh street, for a one-story factory addition 25 x 100 feet.

WISCONSIN

EAU CLAIRE, WIS.—White Machine Works has let contract to Hoeppner-Bartlett Co. for remodeling and converting old Wisconsin Refrigerator Co. plant into machine shop, consisting of a two-story factory 54 x 290 feet and two wings, 52 x 150 and 43 x 150 feet.

PORT WASHINGTON, WIS.—Wisconsin Chair Co. will award contract soon for a one-story factory addition 35 x 100 feet. R. A. Sutherland, 259 East Wells street, Milwaukee, is architect.

MANITOWOC, WIS.—Eastman Mfg. Co., manufacturer of hose couplings, tubing, etc., plans construction of a one-story factory addition. Frederick W. Raeuber is architect.

MILWAUKEE—J. W. Speaker Corp., manufacturer of automotive accessories, has let contract to Selzer-Ornst Co. for extensive alterations and remodeling of its three-story factory.

MILWAUKEE—Acme Machine & Tool Co. has been incorporated to conduct a machine

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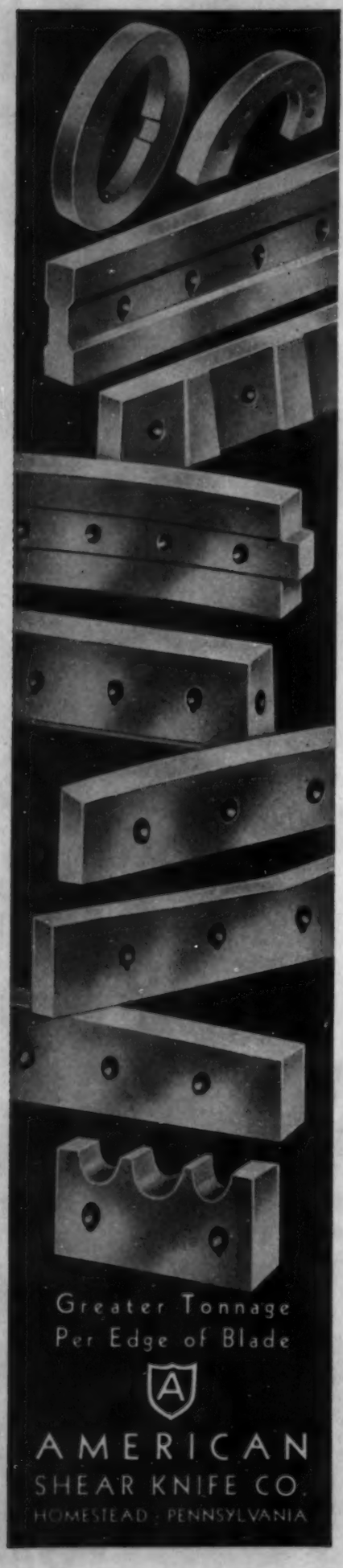

and tool business by I. V. Brossell, C. Brossell and Jack Kader.

RACINE, WIS.—Belle City Malleable Iron Co. has let contract to Nelson & Co. Inc. for a one-story plant addition 60 x 80 feet. Ellis A. Klinger is architect.

MINNESOTA

ST. PAUL, MINN.—War Department has given contract to Fegles Construction Co., Wesley Temple building, Minneapolis, Minn., for conversion of six buildings at the Minnesota state fair grounds into a propeller manufacturing plant, to cost less than $5,000,000 and be operated by the A. O. Smith Corp., Milwaukee. Ellerbe & Co., First National Bank building, St. Paul, are architects and engineers. Major William P. Cornelius, First National Bank building, St. Paul, is area engineer in charge of the project.

ST. PAUL, MINN.—Ford Motor Co., M. N. Johnson, branch manager, has given contract to George J. Grant Construction Co., 893 Como avenue, St. Paul, for a 60 x 245-foot addition to its Twin City plant.

MINNEAPOLIS, MINN.—Gaugemaster Corp., 507 Thorpe building, has been incorporated to manufacture machine tools, by Timothy T. Flynn, H. Schweiger and L. Christiansen

ST. PAUL, MINN.—Stainless Steel Products Co., manufacturer of steel tanks, barrels, etc., has let contract to August Cedarstrand Co., Minneapolis, for a one-story factory addition.

TEXAS

AMARILLO, TEX.—Panhandle Eastern Pipe Line Co., Bartlesville, Okla., has let contract to Bechtel Co., San Francisco, O. E. Dempsey Construction Co., Tulsa, Okla. and H. C. Price Co., Bartlesville, Okla., for extension of pipeline facilities from Amarillo gas fields to increase deliveries to Kansas City, Mo., by 90,000,000 cubic feet daily. Contract includes 120 miles of 6-inch loops and relaying of 35 miles of 22-inch line paralleling main line to Kansas City.

CALIFORNIA

GLENDALE, CALIF. — Story Propeller Co., 6441 San Fernando road, has been formed by Clifford Robbins and will establish a plant at that address.

HOLLYWOOD, CALIF.—Aircraft Tool Engineering Co. has been formed by Theodore Ulmer and Murray M. Borman and will establish a plant at 6507 Sunset boulevard, Hollywood.

HUNTERS POINT, CALIF.—Bureau of Yards and Docks, Navy Department, Eighteenth street and Constitution avenue, Washington, has let contract for submarine dry docks. NOY 6183, to Ben C. Gerwick Inc., 206 Samson street, San Francisco, at about $3,684,000.

LOS ANGELES—Aero Magnetic Laboratories has been incorporated with $75,000 capital, by E. C. Plummer and associates. Hazlett & Plummer, 918 Security building, Los Angeles, are representatives.

LOS ANGELES—Boat & Barge Corp. has been incorporated with 1000 no par value shares, by C. M. Cooper and associates. Overton & Wilson, 630 South Grand avenue, Los Angeles, are representatives.

LOS ANGELES—Atlas Lead Co. has been incorporated with $25,000 capital, by Alex A. Abramson, 812 South Edinburgh avenue, and associates. Robert Arkush, 1215 Bankers building, Los Angeles, is representative.

LOS ANGELES—Rotoplane Corp. has been incorporated with 100 no par value shares, by Milton W. Brod and associates. Ben L. Blue, 215 West Seventh street, Los Angeles, is representative.

LOS ANGELES — Bakewell Aircraft Products Co., 2427 East Fourteenth street, has been formed by G. G. Bakewell, and will establish a plant at that address.

LOS ANGELES—Pacific Marine Construction Co. has been organized by E. S. Fitzpatrick and M. A. Fitzpatrick and will establish a plant at 510 West Sixth street.

LOS ANGELES—California Gasket & Washer Co. has been organized by James M. Sullivan and associates and will establish a plant at 1425 DeLong street.

LOS ANGELES—Airtronics Research Co. has been formed by R. A. Dotterer, secretary of Aero-Crafts Corp., and will establish business at 5245 West San Fernando road, Los Angeles.

LOS ANGELES—Pacific Tool & Die Co. has been organized by Harold A. Seele and will establish a plant at 2319 Southwest Drive, Los Angeles.

LOS ANGELES—Menden Metal Products has been organized by Leon E. Mendelman and will establish its business at 8327 Santa Monica boulevard, Los Angeles.

LYNWOOD, CALIF.—Atlantic Boat Works has been organized by John Rodewald and will establish a plant at 11374 Atlantic boulevard.

SACRAMENTO, CALIF. — Standardized Aircraft Inc. has been organized with 2500 shares no par value, by Wilson Craven and associates, 537 Forum building, Sacramento.

VAN NUYS, CALIF. — Briegleb Aircraft Co., 16005 Bassett street, has been formed by William G. Briegleb, who will establish a plant at that address.

OREGON

COLUMBIA CITY, OREG.—A. A. Muck, 6330 SE Thirty-sixth street, Portland, Oreg., plans a 50-ton per day sponge iron smelter costing about $40,000.

CANADA

HAMILTON, ONT.—Dominion Foundries & Steel Ltd., Depew street, is receiving tenders through Prack & Prack, architects, Pigott building, for construction of plant addition two stories and basement, 32 x 85 feet, estimated to cost, with equipment, $50,000.

HAMILTON, ONT.—B. Greening Wire Co Ltd., 33 Queen street North, has given general contract to Frid Construction Co. Ltd., 128 King street East, and construction work has been started on new plant addition, estimated to cost, with equipment, about $20,000.

KINGSTON, ONT.—Canadian Locomotive Co. Ltd., Ontario street, has given general contract to Canadian Dredge & Dock Co. Ltd., Wellington street, for repairs and additions to docks to cost $55,000. W. Bonn is engineer in charge.

LONDON, ONT.—Canadian Pacific Railway Co. Ltd., T. Munford, divisional engineer, will call tenders immediately for addition to engine house here, to cost about $65,000.

ST. CATHARINES, ONT.—McKinnon Industries Ltd., Ontario street, has received tenders and will let contracts immediately for construction of foundry addition to cost about $97,000. A. E. Nickolson, 46 Queen street, is architect.

WELLAND, ONT.—Atlas Steels Plant Extension Ltd. has extended contract given to Pigott Construction Co. Ltd., Pigott building, Hamilton, Ont., to include construction of a motor room to cost $32,000. The new addition will house electrical equipment to operate 10, 16 and 18-inch mills for the plant on Main street. Building to be two stories, 19 x 241 feet.

WOODSTOCK, ONT.—Oxford Tool Co., Jack Nesbitt, manager, has given contract to George Tindall for construction of plant addition estimated to cost with equipment, about $15,000.

MONTREAL, QUE.—Canadian Vickers Ltd., 5136 Notre Dame street East, has given general contract to Anglin Norcross, Quebec, Ltd., 892 Sherbrooke street West, for construction of a prefabrication shed at the Maisonneuve works, to cost approximately $300,000.

QUEBEC, QUE.—Eastern Canada Steel & Iron Works Ltd., 52 Lesage avenue, will start work at once on repairs and addition to plant to cost about $25,000.

VALLEYFIELD, QUE.—Canadian Bronze Powder Works Ltd., 9 East Park, has given general contract to Cook & Leitch, 1440 St. Catharines street, Montreal, Que., for rebuilding plant unit here. Estimated cost, with equipment, $60,000.

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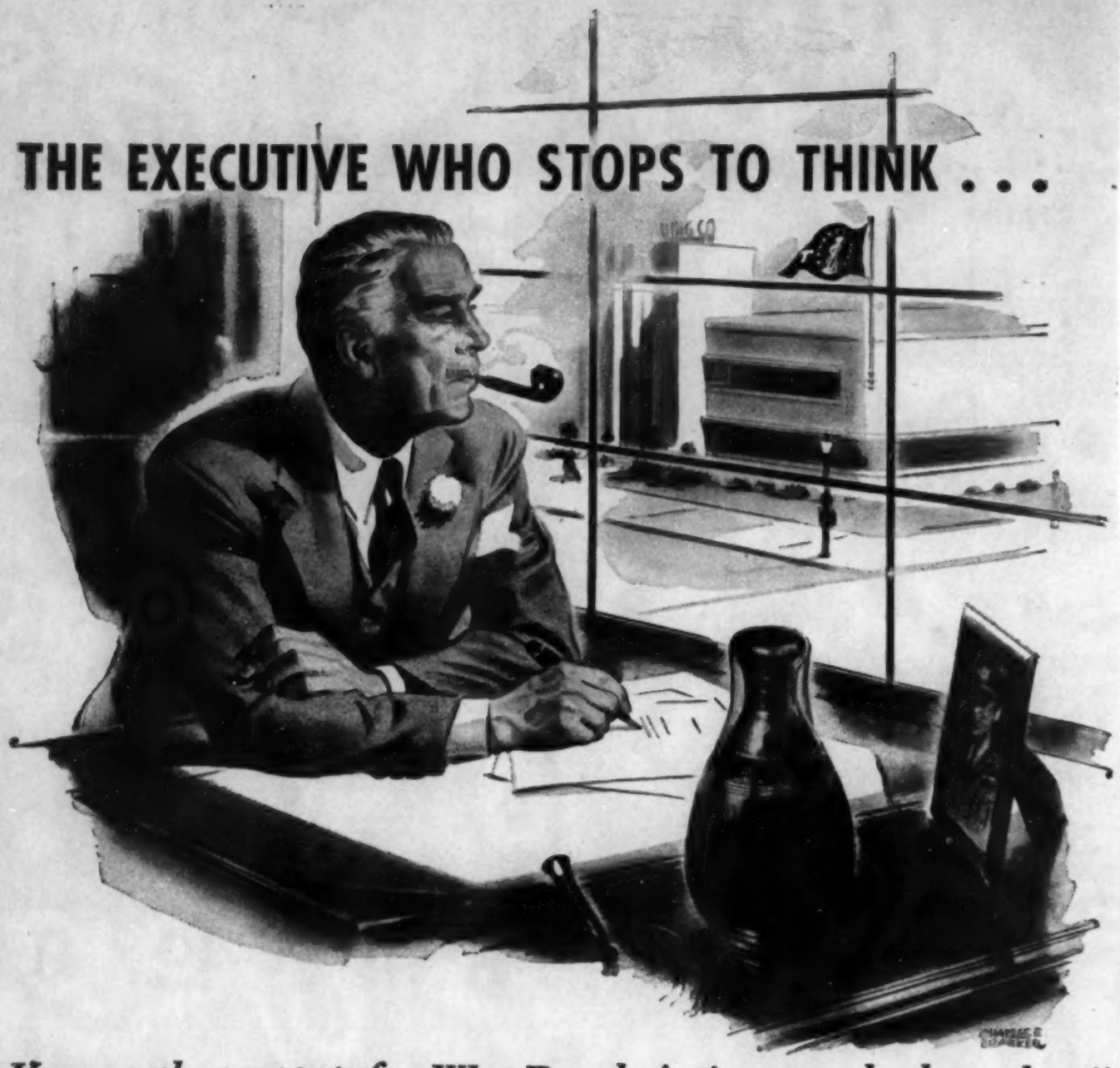

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ADVERTISING INDEX

*Advertisements appear in previous issues.

Where-To-Buy Products Index carried quarterly.

	Page
A	
Abrasive Co.	*
Abrasive Products, Inc.	*
Accurate Spring Mfg. Co.	*
Ace Manufacturing Corp.	*
Acheson Colloids Corp.	*
Adams, R. P., Co., Inc.	*
Aetna-Standard Engineering Co., The	*
Agerstrand Corp.	167
Ahlberg Bearing Co.	*
Air Reduction	44
Ajax Electrothermic Corp.	55
Ajax Flexible Coupling Co.	*
Alan Wood Steel Co.	*
Aldrich Pump Co., The	*
Allegheny Ludlum Steel Corp.	*
Allen-Bradley Co.	*
Alliance Machine Co.	*
Allis-Chalmers Mfg. Co.	9
Alloy Metal Abrasive Co.	*
Alrose Chemical Co.	*
Aluminum Company of America	14
American Agile Corp.	*
American Air Filter Co., Inc.	*
American Brake Shoe Co.	52
American Brass Co.	*
American Bridge Co.	*
American Broach & Machine Co.	*
American Cable Division of American Chain & Cable Co., Inc.	133
American Chain & Cable Co., Inc., American Cable Division	133
American Chain & Cable Co., Inc., American Chain Division	*
American Chain & Cable Co., Inc., Page Steel & Wire Division	*
American Chain & Cable Co., Inc., Wright Manufacturing Division	*
American Chain Division of American Chain & Cable Co., Inc.	*
American Chemical Paint Co.	131
American Crayon Co., The	*
American Foundry Equipment Co.	*
American Gas Association	*
American Hot Dip Galvanizers Association	*
American Metal Hose Branch of the American Brass Co.	*
American Metal Products Co.	21
American MonoRail Co.	83
American Nickeloid Co.	173
American Pipe Bending Machine Co., Inc.	167
American Pulverizer Co.	168
American Roller Bearing Co.	*
American Rolling Mill Co., The	*
American Screw Co.	*
American Shear Knife Co.	172
American Steel & Wire Co.	*
American Zinc Sales Co.	20
Ampco Metal, Inc.	*
Amsler-Morton Co., The	*
Anaconda Wire & Cable Co.	17
Andrews Steel Co., The	*
Anker-Holth Mfg. Co.	140
Apex Machine & Tool Co., The	*
Arkansas Fuel Oil Co.	46
Armstrong-Blum Mfg. Co.	*
Atkins, E. C., & Co.	*
Atlas Car & Mfg. Co.	166
Atlas Drop Forge Co.	173
Atlas Lumnite Cement Co.	*
B	
Babcock & Wilcox Co., Refractories Div.	*
Babcock & Wilcox Tube Co.	30
Bailey, Wm. M., Co.	*
Baker Brothers, Inc.	*
Baker, J. E., Co.	173
Baker-Raulang Co.	*
Baldwin-Southwark Division, The Baldwin Locomotive Works	57
Bantam Bearings Division, The Torrington Co.	*
Barium Stainless Steel Corp.	171
Barnes, Wallace, Co., Division of Associated Spring Corporation	*
Barnes, W. F. and John, Co.	43
Basic Refractories, Inc.	*
Bayard, M. L., & Co.	165
Bay City Forge Co.	*
Bay State Abrasive Products Co.	*
Beall Tool Co.	167
Beatty Machine & Mfg. Co.	*
Belmont Iron Works	171
Bethlehem Steel Co.	1
Birdsboro Steel Foundry & Machine Co.	*
Bissett Steel Co., The	*
Bixby, R. W., Inc.	175
Blanchard Machine Co.	*
Blaw-Knox Co.	8, 64
Blaw-Knox Division, Blaw-Knox Co.	*
Bliss & Laughlin, Inc.	*
Blodgett, G. S., Co., Inc.	*
Bloom Engineering Co.	*
Bohn Aluminum & Brass Corp.	*
Bridgeport Brass Co.	*
Bristol Brass Corp., The	*
Brooke, E. & G., Iron Co.	173
Brosius, Edgar E., Co.	158
Brown & Sharpe Mfg. Co.	*
Brown Instrument Co., The	*
Bryant Chucking Grinder Co.	13
Bryant Machinery & Engineering Co.	*
Buda Co., The	*
Buffalo Forge Co.	*
Bullard Co., The	*
Bundy Tubing Co.	*

	Page
C	
Cadman, A. W., Mfg. Co.	170
Calcos Steel & Iron Co.	171
Carboloy Co., Inc.	115
Carborundum Co., The	34
Cardox Corp.	*
Carnegie-Illinois Steel Corp.	48, 49
Carpenter Steel Co., The	*
Cattie, Joseph P., & Bros., Inc.	*
Ceilcote Co., The	*
Central Screw Co.	*
Century Electric Co.	117
Chambersburg Engineering Co.	*
Champion Rivet Co., The	*
Chase Foundry & Mfg. Co.	*
Chicago Mfg. & Distributing Co.	*
Chicago Metal Hose Corp.	*
Chicago Perforating Co.	169
Chicago Rawhide Mfg. Co.	*
Chicago Tramrail Co.	62
Chicago Vitreous Enamel Product Co.	*
Chicago Wheel & Mfg. Co.	*
Cincinnati Grinders, Inc.	*
Cincinnati Milling Machine Co.	*
Cincinnati Shaper Co., The	*
Cities Service Oil Co.	46
Clark Tructractor Div. of Clark Equipment Co.	*
Cleereman Machine Tool Co.	*
Cleveland Automatic Machine Co.	135
Cleveland Cap Screw Co.	60
Cleveland-Cliffs Iron Co.	6
Cleveland Crane & Engineering Co.	45
Cleveland Hotel	*
Cleveland Pneumatic Tool Co., The	*
Cleveland Punch & Shear Works Co.	*
Cleveland Tramrail Division, Cleveland Crane & Engineering Co.	*
Cleveland Twist Drill Co., The	*
Cleveland Worm & Gear Co., The	*
Climax Molybdenum Co.	88
Clipper Mfg. Co., The	*
Cold Metal Products Co.	*
Colonial Broach Co.	*
Columbia Steel Co.	48, 49
Columbus Die, Tool & Machine Co.	173
Commercial Forgings Co., The	165
Commercial Metals Treating, Inc.	*
Cone Automatic Machine Co., Inc.	*
Consolidated Machine Tool Corp.	*
Continental Machines, Inc.	*
Continental Roll & Steel Foundry Co.	*
Continental Screw Co.	*
Continental Steel Corp.	*
Cooper-Bessemer Corp.	*
Copperweld Steel Co.	42
Cowles Tool Co.	167
Crane Co.	*
Cross Gear & Machine Co.	*
Cuban-American Manganese Corp.	171
Cullen-Friestedt Co.	*
Cunningham, M. E., Co.	*
Curtis Pneumatic Machinery Division of Curtis Manufacturing Co.	*
Cutler-Hammer, Inc.	*
D	
Darwin & Milner, Inc.	171
Davenport Besler Corp.	*
Davis & Thompson Co.	*
Davis Brake Beam Co.	*
Delta Manufacturing Co., The	*
Denison Engineering Co., The	*
DeSanno, A. P., & Son, Inc.	*
Despatch Oven Co.	31
Detroit Electric Furnace Division, Kuhlman Electric Co.	*
Detroit-Leland Hotel	146
Detroit Rex Products Co.	156
Detroit Tap & Tool Co.	*
DeWitt Operated Hotels	*
Diamond Tool Co.	*
Diebold, Inc.	*
Dietert, Harry W., Co.	*
Differential Steel Car Co.	169
Disston, Henry, & Sons, Inc.	*
Dodge Manufacturing Corp.	*
Dow Chemical Co., The	125
Downs Crane & Hoist Co.	*
Drave Corp., Machinery Div.	167
Dulien Steel Products, Inc.	174
E	
Easton Car & Construction Co.	*
Edison, Thomas A., Inc.	*
Egyptian Lacquer Mfg. Co., The	*
Elastic Stop Nut Corp.	18
Electric Controller & Mfg. Co.	*
Electric Furnace Co., The	*
Electric Storage Battery Co.	123
Electro Metallurgical Co.	*
Elliott Manufacturing Co.	*
Elwell-Parker Electric Co., The	*
Enterprise Galvanizing Co.	*
Erdle Perforating Co., The	169
Erie Bolt & Nut Co.	141
Erie Foundry Co.	*
Etna Machine Co.	*
Euclid Crane & Hoist Co., The	*
Eureka Fire Brick Works	*
Eutectic Welding Alloys Co.	162
Ex-Cell-O Corp.	*

	Page
F	
Fafnir Bearing Co., The	32
Fairbanks, Morse & Co.	*
Fairfield Mfg. Co.	*
Farquhar, A. B., Co., Ltd.	22
Farrell-Cheek Steel Co.	*
Farval Corp., The	Inside Back Cover
Ferracute Machine Co.	*
Fidelity Machine Co.	*
Firth-Sterling Steel Co.	*
Fitchburg Grinding Machine Corp.	*
Fitzsimons Co., The	138
Flori Pipe Co., The	41
Foote, Brad, Gear Works	*
Foote Bros. Gear & Machine Corp.	37
Fosdick Machine Tool Co.	*
Foster, Frank B.	174
Foster, L. B., Co., Inc.	174
Foxboro Co., The	*
Fox Grinders, Inc.	*
Frasse, Peter A., & Co., Inc.	*
Freyn Engineering Co.	*
Fuller Brush Co.	165
G	
Galland-Henning Mfg. Co.	*
Garrett, Geo. K., Co.	*
General Blower Co.	174
General Electric Co.	28, 36
General Excavator Co.	*
General Steel Warehouse Co., Inc.	*
Genesee Tool Co.	*
Gisholt Machine Co.	*
Globe Brick Co., The	*
Granite City Steel Co.	*
Grant Gear Works	*
Graver Tank & Mfg. Co., Inc.	*
Graybar Electric Co.	68
Great Lakes Steel Corp.	11
Greenfield Tap & Die Corp.	50
Greenspon's, Jos., Son Pipe Co.	174
Grinnell Co., Inc.	*
Gruendler Crusher & Pulverizer Co.	*
H	
Hagan, George J., Co.	*
Haines Co., The	175
Hammond Brass Works	160
Hanlon-Gregory Galvanizing Co.	*
Hanna Furnace Corp.	144
Hannifin Mfg. Co.	*
Hansen Mfg. Co.	*
Harbison-Walker Refractories Co.	*
Harnischfeger Corp.	*
Harper, H. M., Co., The	*
Harrington & King Perforating Co.	143
Hassal, John, Inc.	*
Hays Corp., The	*
Heald Machine Co.	Inside Front Cover
Heil Engineering Co.	*
Helmer-Staley, Inc.	*
Hendrick Manufacturing Co.	169
Heppenstall Co.	33
Hercules Co., The	*
Hevi-Duty Electric Co.	*
Hill Acme Co., The	*
Hills-McCanna Co.	*
Hindley Mfg. Co.	*
Hobart Bros. Co.	169
Holden, A. F., Co.	Front Cover
Homestead Valve Mfg. Co.	*
Horsburgh & Scott Co.	*
Houghton, E. F., & Co.	*
Howard Foundry Co.	*
Hubbard, M. D., Spring Co.	163
Hughes-Keenan Co., The	*
Hyatt Bearings Division, General Motors Corporation	*
Hyde Park Foundry & Machine Co.	*
Hydraulic Machinery, Inc.	*
Hydraulic Press Mfg. Co., The	91
Hydro-Arc Furnace Corp.	*
Hydropress, Inc.	*
I	
Illinois Clay Products Co.	*
Illinois Tool Works	*
Independent Engineering Co.	*
Induction Heating Corp.	*
Industrial Brownhoist Corp.	*
Industrial Oven Engineering Co., The	*
Ingersoll Steel & Disc Division, Borg-Warner Corp.	61
Inland Steel Co.	71
International Nickel Co., Inc.	12
Iron & Steel Products, Inc.	174
Irwin, H. G., Lumber Co.	*
J	
Jackson Iron & Steel Co., The	*
James, D. O., Mfg. Co.	161
J-B Engineering Sales Co., The	*
Jeffrey Manufacturing Co., The	*
Jessop Steel Co.	*
Jessop, Wm., & Sons, Inc.	171
Johns-Manville Corp.	*
Johnson Bronze Co.	*
Johnson Gas Appliance Co.	*
Johnson Steel & Wire Co., Inc.	*
Jones & Lamson Machine Co.	*
Jones & Laughlin Steel Corp.	*
Jones, W. A., Foundry & Machine Co.	*

(Continued on next page)

ADVERTISING INDEX

*Advertisements appear in previous issues.

Where-To-Buy Products Index carried quarterly.

Page

(Continued from preceding page)

K

Kardong Brothers, Inc. *
Kaydon Engineering Corp., The 15
Kearney & Trecker Corp. 16
Kemp, C. M., Mfg. Co. *
Kennametal, Inc. 120
Kester Solder Co. *
Keystone Steel & Wire Co. *
Kidde, Walter, & Co., Inc. 129
King Fifth Wheel Co. *
King Foundries, Inc. 175
Kinnear Mfg. Co. 142
Kirk & Blum Mfg. Co. 175
Kold-Hold Manufacturing Co. *
Koppers Co. *
Kropp Forge Co. 7

L

Ladish Drop Forge Co. *
Lake City Malleable Co. *
Lakeside Steel Improvement Co., The *
Laminated Shim Co. *
Lamson & Sessions Co., The *
Lamson Corp. *
Landis Machine Co. *
Lang Machinery Co. 174
Lapointe Machine Tool Co., The *
Latrobe Electric Steel Co. *
Layne & Bowler Inc. *
Lebanon Steel Foundry Co. *
LeBlond, R. K., Machine Tool Co., The *
Leeds & Northrup Co. *
Lee Spring Co., Inc. 146
Lepel High Frequency Laboratories, Inc. *
Leschen, A., & Sons Rope Co. *
Levinson Steel Co., The *
Levinson Steel Sales Co. *
Lewin-Mathes Co. *
Lewis Foundry & Machine Division of Blaw-Knox Co. 64
Lewis Machine Co., The *
Lincoln Electric Co., The *
Linde Air Products Co., The *
Link-Belt Co. *
Logemann Bros. Co. *
Lovejoy Flexible Coupling Co. 169
Luers, J. Milton *
Lyon-Raymond Corp. *

Mc

McKay Co., The *
McKay Machine Co. *
McKee, Arthur G., Co. *

M

MacDermid, Inc. *
Mackintosh-Hemphill Co. *
Macklin Co. *
Macwhyte Co. *
Maehler, Paul, Co., The *
Magnaflux Corp. *
Magnus Chemical Co. *
Mahon, R. C., Co., The *
Mahr Manufacturing Co. *
Mallory, P. R., & Co., Inc. 40
Manheim Manufacturing & Belting Co. *
Manning, Maxwell & Moore, Inc. *
Markal Co. *
Master Electric Co., The *
Mathews Conveyer Co. *
Matthews, Jas. H., & Co. *
Mattison Machine Works *
Medart Co., The *
Mechanite Research Institute 25
Mercury Mfg. Co. *
Mesta Machine Co. 29
Metal & Thermit Corporation 119
Michiana Products Corp. *
Michigan Seamless Tube Co. *
Michigan Tool Co. *
Micromatic Hone Corp. *
Midvale Co., The *
Midwest Steel Corp. 174
Milwaukee Metal Spinning Co. *
Minnesota Mining & Mfg. Co. *
Mississippi Valley Equipment Co. 174
Moltrup Steel Products Co. *
Molybdenum Corporation of America *
Monarch Machine Tool Co., The 66
Monarch Steel Co. 138
Morgan Construction Co. *
Morgan Engineering Co. *
Morrison Engineering Corp. 164
Morton Salt Co. *
Motch & Merryweather Machinery Co. *
Motor Products Corp. *
Mueller Brass Co. *

N

National Acme Co. 58
National Bearing Metals Corp. *
National Broach & Machine Co. *
National Carbon Co., Inc., Carbon Sales Division *
National Fireproofing Corp. 173
National Lead Co. *
National Lock Washer Co. *
National Machinery Co., The *
National Roll & Foundry Co. *
National Steel Corp. 11, 144
National Tube Co. *
New Departure Division General Motors Corp. *
New Jersey Zinc Co. *
Newport Rolling Mill Co., The *
New York & New Jersey Lubricant Co. *
Niagara Machine & Tool Works *
Nilson, A. H., Machine Co. 175

Page

Nitralloy Corp., The *
Norma-Hoffmann Bearings Corp. *
Northwest Engineering Co. *
Norton Co., The *

O

Oakite Products, Inc. 145
Ohio Crankshaft Co. *
Ohio Electric Mfg. Co. 173
Ohio Galvanizing & Mfg. Co. 173
Ohio Knife Co., The 143
Ohio Locomotive Crane Co., The 169
Ohio Machine Tool Co., The *
Ohio Seamless Tube Co., The *
Ohio Steel Foundry Co., The *
Oliver Iron & Steel Corp. *
O'Neil-Irwin Mfg. Co. *
Osgood Co., The *
Oster Mfg. Co., The 27

P

Page Steel & Wire Division American Chain & Cable Co., Inc. *
Pangborn Corp. *
Park Chemical Co. *
Parker-Kalon Corp. *
Peabody Engineering Corp. *
Pennsylvania Flexible Metallic Tubing Co. *
Pennsylvania Industrial Engineers 169
Pennsylvania Salt Mfg. Co. *
Penola Lubricants 163
Perkins, B. F., & Son, Inc. *
Philadelphia Gear Works 54
Phillips Screw Manufacturers *
Phoenix Mfg. Co. *
Pittsburgh Crushed Steel Co. *
Pittsburgh Gear & Machine Co. *
Pittsburgh Lectromelt Furnace Corp. *
Pittsburgh Plate Glass Co. *
Pittsburgh Rolls Division of Blaw-Knox Co. *
Plymouth Locomotive Works Division of The Fate-Root-Heath Co. 24
Pollock, William B., Co., The *
Poole Foundry & Machine Co. *
Porter, H. K., Co., Inc. *
Porter, H. K., Inc. *
Pressed Steel Car Co., Inc. *
Pressed Steel Tank Co. *
Progressive Welder Co. *
Protected Steel Products Co. *
Purdy, A. R., Co., Inc. *
Punch-Lok Co. *

R

Racine Tool & Machine Co. *
Ransohoff, N., Inc. *
Ransome Machinery Co. *
Raymond Mfg. Co., Division of Associated Spring Corp. *
Reading Chain & Block Corp. 144
Ready-Power Co. *
Reeves Steel & Manufacturing Co. *
Reid-Avery Co., The *
Reliance Electric & Engineering Co. *
Republic Drill & Tool Co. *
Republic Steel Corp. 35
Revere Copper & Brass, Inc. 113
Rhoades, R. W., Metaline Co., Inc. *
Richards, Arklay S., Co., Inc. *
Riehle Testing Machines Division of American Machine & Metals, Inc. *
Roebling's, John A., Sons Co. *
Rollway Bearing Co., Inc. *
Roosevelt Hotel *
Roper, George D., Corp. *
Ross Heater & Mfg. Co., Inc. 157
R-S Products Corporation 139
Ryemelin Mfg. Co. *
Russell, Burdsall & Ward Bolt & Nut Co. *
Rustless Iron & Steel Corp. *
Ryerson, Joseph T., & Son, Inc. 72

S

Saginaw Malleable Iron Div. General Motors Corp. *
St. Joseph Lead Co. *
St. Louis Button Co. 173
Salem Engineering Co. 53
Samuel, Frank, & Co., Inc. *
Sandvik Steel, Inc. *
Savage Tool Co. 47
Scaife Co. *
Scherr, George, Co. *
Sellers, Wm., & Co., Inc. *
Seneca Wire & Mfg. Co., The 171
Seymour Mfg. Co., The *
Shawinigan Products Corp. 173
Sheffield Corp., The *
Shell Oil Co., Inc. *
Shenango Furnace Co., The *
Shenango-Penn Mold Co. *
Shepard Niles Crane & Hoist Corp. *
Shuster, F. B., Co., The *
Silent Hoist Winch & Crane Co. *
Simonds Gear & Mfg. Co. 171
Simonds Saw & Steel Co. *
Sinclair Refining Co. *
SKF Industries, Inc. *
Smidth, F. L., & Co. *
Smith, David, Steel Co., Inc. 171
Smith Oil & Refining Co. *
Smith Tool & Engineering Co. *
Smit, J. K., & Sons, Inc. *
Snyder, W. P., & Co., Inc. *
Socony-Vacuum Oil Co., Inc. 95
Sonken-Galamba Corp. 174
South Bend Lathe Works 148
Spriesch Tool & Manufacturing Co. *

Page

Standard Steel Works *
Standard Tube Co., The *
Stanley Works, The *
Steel & Tubes Division, Republic Steel Corp. *
Steel Founders' Society of America *
Steel Improvement & Forge Co., The *
Steelweld Machinery Division, Cleveland Crane & Engineering Co. 45
Sterling Grinding Wheel Div. of the Cleveland Quarries Co. *
Streeter-Amet Co. *
Stromberg-Carlson Co. *
Strom Steel Ball Co. 163
Strong Steel Foundry Co. *
Struthers Wells Corp. *
Sturtevant, B. F., Co. *
Sturtevant, P. A., Co. *
Sun Oil Co. *
Superior Steel Corp. 142
Surface Combustion Corp. *
Swindell-Dressler Corp. 26
Syntron Co. *

T

Talon, Inc., Steel Tube Division 23
Taylor-Wilson Mfg. Co. *
Tennessee Coal, Iron & Railroad Co. *
Texas Co., The *
Thomas Flexible Coupling Co. *
Thomas Machine Mfg. Co. *
Thomas Steel Co., The *
Tide Water Associated Oil Co. *
Timken Roller Bearing Co. Back Cover
Timken Steel & Tube Division, The Timken Roller Bearing Co. *
Tinnerman Products, Inc. 93
Titanium Alloy Manufacturing Co. *
Toledo Scale Co. *
Toledo Stamping & Mfg. Co. *
Tomkins Johnson Co., The *
Torrington Co., The *
Towmotor Co. 137
Traban Engineering Corp. 65
Triplex Screw Co., The *
Trundle Engineering Co. *
Tubular Alloy Steel Corp. *
Turchan Follower Machine Co. *
Turco Products, Inc. *
Turner Gauge Grinding Co. *

U

Udylite Corp., The *
Union Carbide & Carbon Corp. *
Union Drawn Steel Div., Republic Steel Corp. *
Union Steel Castings Division of Blaw-Knox Co. 8
United Chromium, Inc. 59
United Engineering & Foundry Co. 2, 3
United States Graphite Co. 159
United States Rubber Co. *
United States Steel Corp. Subsidiaries 48, 49
United States Steel Export Co. 48, 49
United States Steel Supply Co. 48, 49

V

Vanadium Alloys Steel Co. *
Vanadium Corporation of America *
Vaughn Machinery Co., The *
Veeder-Root, Inc. *
Vickers, Inc. *

W

Waldron, John, Corp. *
Walker-Turner Co., Inc. *
Ward Leonard Electric Co. *
Warner & Swasey Co. *
Washburn Wire Co. *
Watson-Stillman Co., The 19
Wean Engineering Co., The *
Weatherhead Co., The *
Webb Corporation, The 161
Weinman Pump & Supply Co., The *
Weirton Steel Corp. *
Welding Engineering Co. 147
Welding Equipment & Supply Co. *
Wellman Bronze & Aluminum Co. 145
Wellman Engineering Co. *
Wells Manufacturing Co. *
Wesson Co. *
Westinghouse Electric & Mfg. Co. 38, 39, 63
West Penn Machinery Co. *
West Steel Casting Co. 173
Wheeling Steel Corporation 171
Whitcomb Locomotive Co., The *
Whitehead Stamping Co. *
Wickes Brothers *
Wickwire Brothers, Inc. *
Wickwire Spencer Steel Co. *
Williams, J. H., & Co. 173
Wilson, Lee, Engineering Co. *
Wilson Welder and Metals Co., Inc. *
Wisconsin Motor Corp. *
Wolverine Tube Div., Calumet & Hecla Consolidated Copper Co. *
Wood, R. D., Co. *
Worthington Pump & Machinery Corp. *
Worth Steel Co. 51
Wright Manufacturing Div., American Chain & Cable Co., Inc. *
Wrought Washer Mfg. Co. 161
Wyckoff Drawn Steel Co. *

Y

Yoder Co., The 10
Youngstown Alloy Casting Corp. *
Youngstown Sheet & Tube Co., The 56

Z

Zeh & Hahnemann Co. 169

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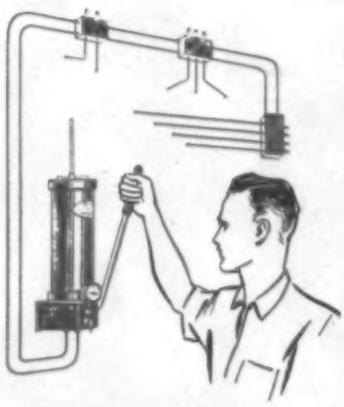

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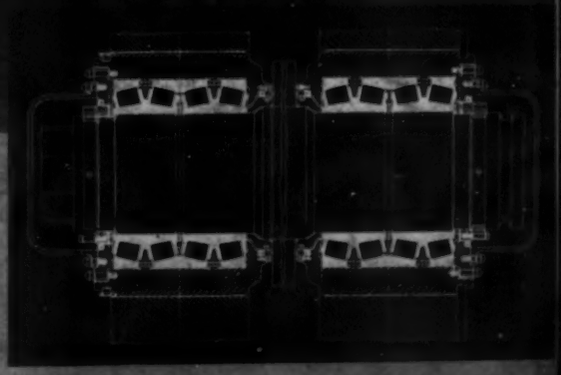

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